STORY OF FORT WAYNE'S WATER SYSTEM

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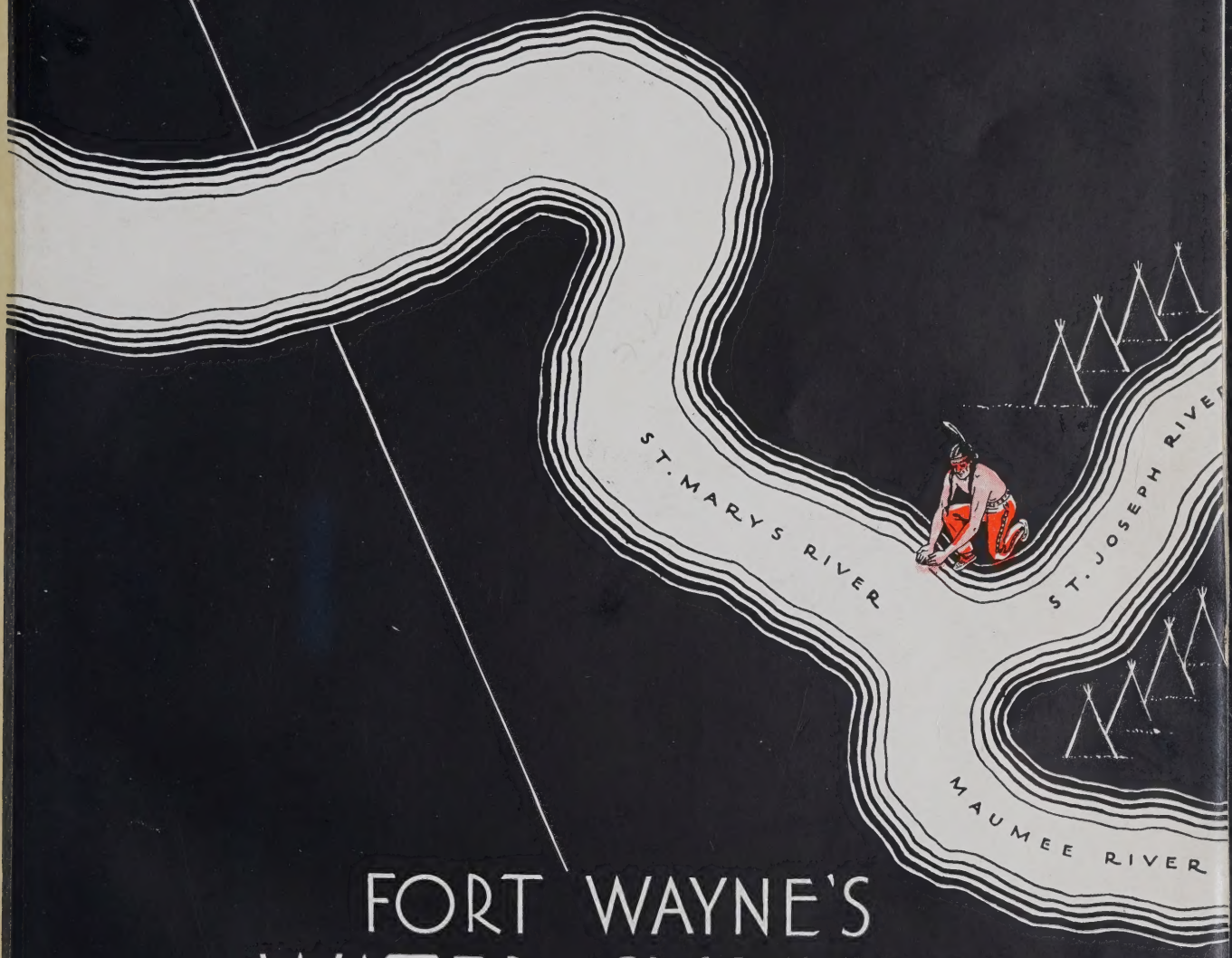
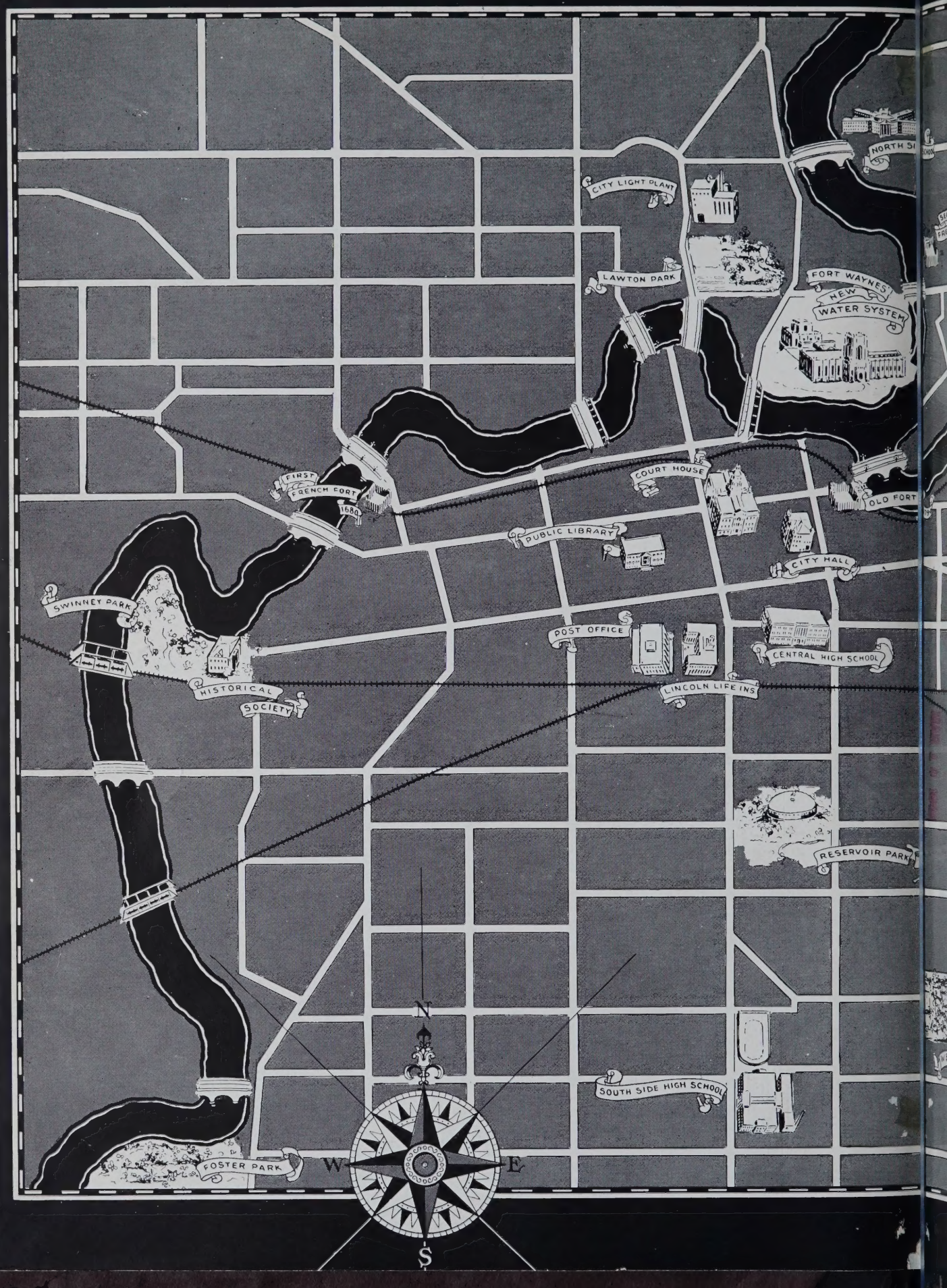
The Story of



FORT WAYNE'S WATER SYSTEM

DECEMBER 1933


CITY LIGHT PLANT
LAWTON PARK
FORT WAYNE'S NEW WATER SYSTEM
FIRST FRENCH FORT 1680
COURT HOUSE
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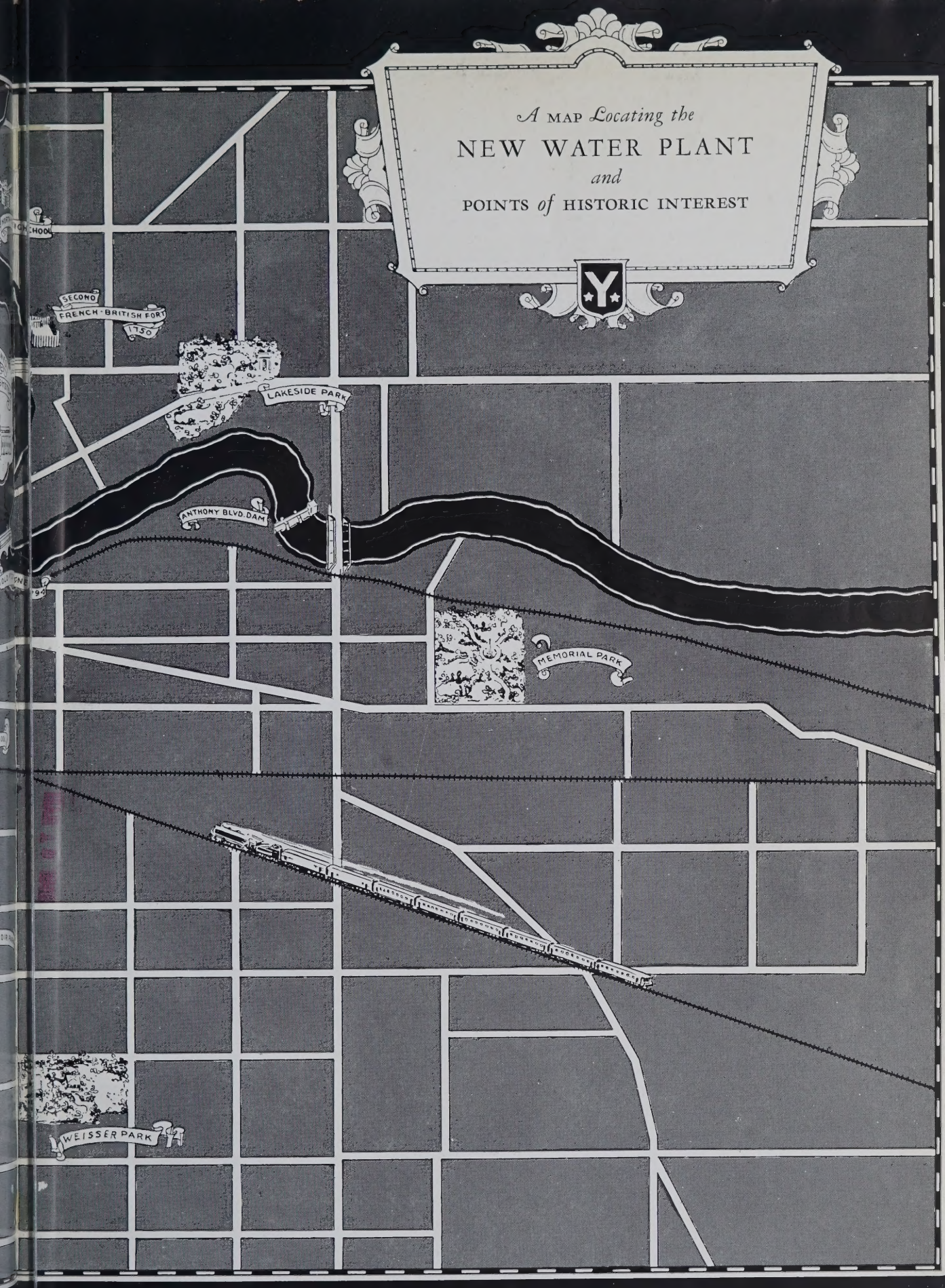

A MAP Locating the
NEW WATER PLANT
and
POINTS of HISTORIC INTEREST
SECOND
FRENCH-BRITISH FORT
1750
LAKESIDE PARK
ANTHONY BLVD. DAM
MEMORIAL PARK
WEISSER PARK

Dedicated

to the

CITIZENS OF FORT WAYNE, INDIANA

by

CONTRACTORS AND MANUFACTURERS
WHO CO-OPERATED IN THE BUILDING

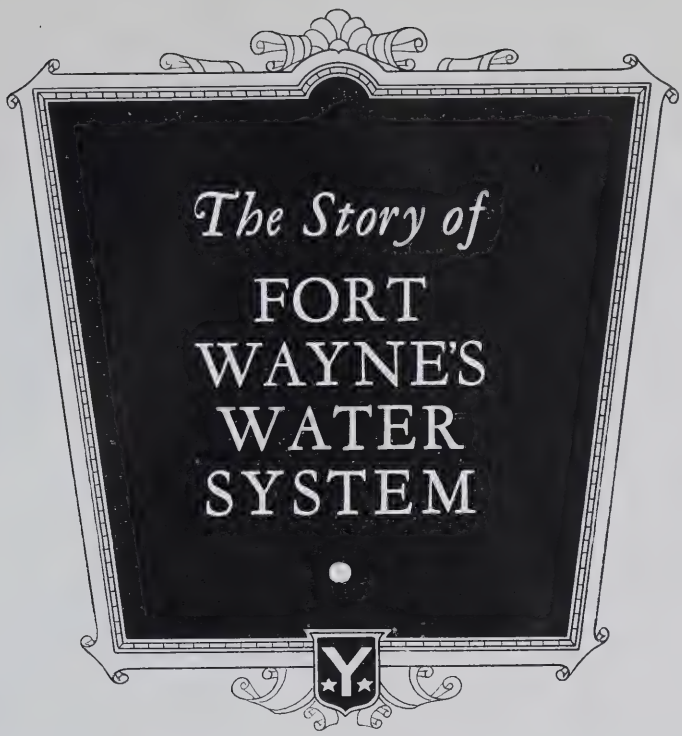
of the

THREE RIVERS PROJECT

PLANNED AND EDITED

by

Carl J. Suedhoff



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DEDICATION SOUVENIR

DECEMBER, 1933

FOREWORD

IN AN ancient sacred story of how civilization began, the record runs that when primitive men first banded together for community life "they pitched their tents, they built an altar, and they provided a flow of pure water." So there were then, as there always will be, these three fundamentals for happy living:—The Home, for man's inner life; the Altar, for men's upward look to the Infinite; and the public Fountain or Well, symbol of those common needs which the State or City as a whole must provide.

The City of Fort Wayne, in the course of providing for those common needs, today celebrates a notable achievement. In order to secure for all its people in the years to come an abundant "flow of pure water" it has completed a waterworks improvement embodying all the magic skill which modern science can supply. The project has called for extensive planning, painstaking devotion to innumerable details over the past three years of actual construction, and maximum efficiency plus economy. It has been done also with thought for those ideals of beauty which are a "joy forever" and which give to a community a permanent distinction. Several persons have figured conspicuously in the development of the task, foremost among them being Mayor Wm. J. Hosey and Messrs. John Trier, David Erwin and C. A. Ramsey of the Board of Public Works. To them and to the Consulting Engineers this plant represents the achievement of a scientific and civic goal into which they have poured a continuous personal service. Their stewardship as servants of the city has been a devoted one, and their goal has been the common good.

Now a great work has been completed and a civic institution stands equipped to render the people its vital service. Around its completion and about its operation centers a fascinating story. This memorial booklet has been prepared to present, in word and picture, some of that story from its beginning to the present. It is the story of the history and problems of a city's water supply. It is in part a story of technical and scientific detail written for these pages by the engineers and experts. It is a story of co-operation and leadership. It is dedicated to the people of Fort Wayne, their children and their children's children who in time to come, as they build their Homes and raise their Altars will also find supplied for them a "flow of pure warer," abundant and fresh, giving life and health to a prosperous City.

First Steam Water Works—Built 1881—Located in Lawton Park. Site of present City Light & Power Plant.

1 8 8 1

One of the original 5 million gallon pumps—Purchased in 1885. Previously located in building illustrated above.

Old 5,000,000 gallon capacity Reservoir, located in Reservoir Park. Still in use.

HISTORIETTE

by

EARL L. GAINES
President Fort Wayne Historical Society

WHEN white men first visited the site of Fort Wayne, the point of land lying between the St. Marys and St. Joseph rivers was partly occupied by a Miami Indian village called Ke-Ki-Onga. The village was located on both sides of the St. Joseph River. The part of the village on the east side of the river (in the present Lakeside) was later occupied by Shawnees. The principle part of the Miami Village on the west side of the river extended north of the confluence of the rivers about a quarter of a mile. The ground upon which the Fort Wayne Water Works stands was at that time low land which readily overflowed in times of high water. A few wigwams were located along the water's edge on the north bank of the St. Marys about midway between the present Spy Run bridge and the St. Joseph river. The remainder of the village was on higher ground beyond the northern edge of the present Water Works site.

Knowledge of the present site of Fort Wayne was first brought to civilization by Champlain, who is believed to have seen the Maumee in 1614. In 1632 he made a map of the Great Lakes district showing the Maumee, St. Marys and St. Joseph rivers.

In 1682 the French chose the headwaters of the Maumee as the site of an outpost in the wilderness and built a fort on the south bank of the St. Marys at what is now the west end of Superior Street. In 1750 the French built a new fort on higher ground on the east bank of the St. Joseph river at the west end of Delaware Avenue. At the close of the French and Indian War in 1760 this second French fort fell into the hands of the British, who garrisoned and maintained it as a military outpost until 1763 when the commandant, Ensign Holmes, and his garrison were murdered in the Pontiac conspiracy.

During the period just before the Revolution, French traders and adventurers settled in the Miami village in considerable numbers. Most of the French dwellings were located on what was then low ground where the Water Works building now stands. At this time the village was known as the Miami Town. This village was almost completely under water in the flood of the rivers in February 1790, the first recorded flood in Fort Wayne.

In 1780 a Frenchman by the name of LaBalme who had come to America with Lafayette recruited about 200 followers at Vincennes and, coming up the Wabash and over the portage to Miami Town, pillaged the village, robbed the trading stores located on the Water Works site and retreated for the night to a supposed point of safety a few miles from the village. That night Chief Little Turtle and his Miami warriors fell upon them and massacred all but one man whom they took to the British commander at Detroit as proof of their loyalty to Great Britain.

In 1790 the Battle of Harmar's Defeat was partially fought in the old Indian village on the west bank of the St. Joseph. Major Hall's troops attacked the village from the west, advancing across Spy Run Creek. The troops of Major Fontaine and Major McMullen attacked from the north and east, through Lakeside, while Major Wyllys attempted to advance across the Maumee from the south. Major Wyllys and 79 of his men were killed in crossing the Maumee. More than 600 Indians were killed in attempting to cross the river near the present Tennessee Avenue bridge. The total loss to the Americans in this battle was 12 officers and 183 men.

As the French had formerly done, General Anthony Wayne in 1794 also selected the junction of the three rivers as a site on which to build his fort. Wayne's fort was erected on the south side of the St. Marys across the river from the Water Works site at what is now the corner of Clay and Berry Streets.

Bird's-eye view of new Three Rivers Filtration and Pumping Station. Three Rivers Park.

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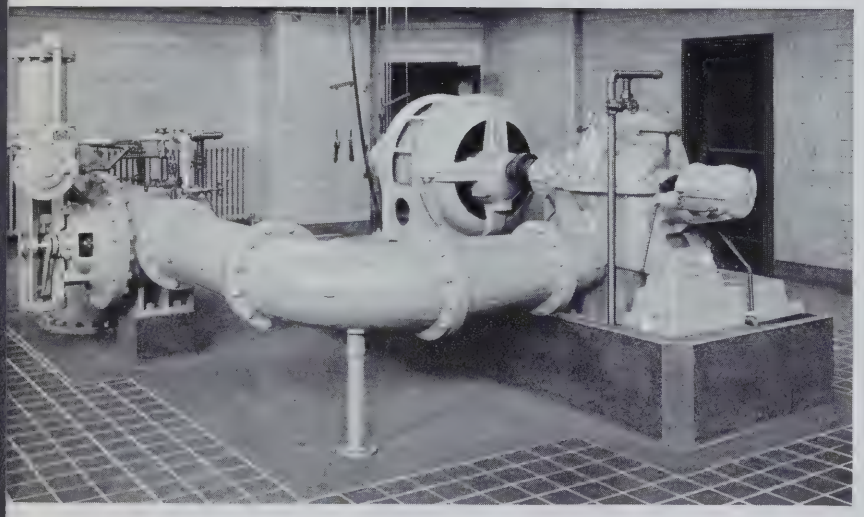


One of the six new high service pumps and cone valves to be placed in service at Three Rivers Station. Capacity 5,600 G.P.M.

View of construction of new 20,000,000 gallon Filtered Water Reservoir. View taken July 24, 1931.

The home of Captain William Wells, a son-in-law of Chief Little Turtle and captain of General Wayne's Indian scouts, was located at the northern edge of the Water Works site in the rear of 1410 Spy Run Avenue. In 1808 Congress, in recognition of Captain Wells' services to the government, granted to him the right to pre-empt, or buy, at $1.25 per acre the half section of land on which his home was located, including the present Water Works site. In 1812 Chief Little Turtle died in the home of Captain Wells. He was buried at the northern end of the village in the rear of the lot at 634 Lawton Place, now the home of Dr. George W. Gillie.

And so for centuries past, the point of land lying between the St. Marys and St. Joseph rivers where they join to form the Maumee has formed the center of the stage for a historical pageant unparalleled in American history. This particular spot at the headwaters of the Maumee upon which the magnificent building of the Fort Wayne Water Works now stand has marked in turn the passing of the prehistoric mound builders, the Indian tribes of the Iroquois, the Shawnee and the Miami, the early Jesuit missionary and explorer, the French trapper, trader and adventurer and the British conqueror, all of whom gave way at last to the hardy American pioneer. The flags of three great modern nations—the Tri-color of France, the Union Jack of Great Britain and our own Stars and Stripes—have waved proudly from forts within gun shot of the site. The waters of the three rivers have run red with the blood of hundreds of men, savage and civilized alike, who have fought and died for the possession of this meeting place of the waters. The ultimate triumph of the hardy American pioneer has finally brought lasting peace to this favored district of the old Northwest.

Fort Wayne's origin is intimately related with the exploration and early development of the middle west. Situated at the junction of the St. Marys and St. Joseph Rivers and at the head of the Maumee River, the principal avenues of trade when the white man first explored the country, the site of Fort Wayne has been an important trading and commercial point for 250 years. Its importance as a modern commercial center dates from the time of the completion of the Wabash and Erie Canal in 1843. Here at Fort Wayne the St. Joseph River supplied water to the summit level of this canal.

In the early days, fire protection for the buildings of the city was provided by pumping from the canal, using long lines of hose. This method was, of course, limited in its scope, and as the city grew, cisterns were constructed under the street and filled with water from which pumpers drew and delivered it through hose lines to the seat of the fire. The first Water Works for the city was constructed in 1880 after a controversy extending over several years. The original cost of the works was slightly over $250,000. The supply was from deep driven wells. During the fifty years from 1880 to 1930 the city's water supply has been developed from the ground by enlargement and extension of the original system. Within recent years the limitations of these sources of supply have been increasingly apparent, particularly to those charged with its maintenance and operation, and in some degree by the consumers as well.

View in Entrance Lobby showing Neon lighted display well where finally purified water is viewed. Three Rivers Station. View taken May 17, 1933.

Filter Control Gallery, looking east from office corridor. View taken May 17, 1933.

Corridor in Chemical Building looking north from Passageway Building. View taken May 18, 1933.

DEVELOPMENTS

by

DAVID ERWIN

Shortcomings of the Well Water Supply

In 1930, following several years of acute water shortage during the summer sprinkling season, the matter of new supply came in for general public consideration. Engineers were engaged and a report upon the city's water supply system was rendered. This report embraced its limitations and shortcomings, the water supply needs of the growing city, the possibility of obtaining additional water from wells in or near Fort Wayne, available sources of surface water, a recommended general plan for a new supply, and a plan for financing these improvements. Some of the more important facts disclosed by this study were: That the practical yield of the city's present well field had already been reached; and that the drilling of additional wells would not produce water in sufficient additional quantity to justify the expense.

The well water supply is excessively hard, the total hardness varying from about 400 parts per million in some wells to about 750 parts per million in others and averaging about 550 parts per million. Many cities of the size of Fort Wayne having water supplies not nearly as hard have provided for softening.

Fort Wayne's Water Supply Needs

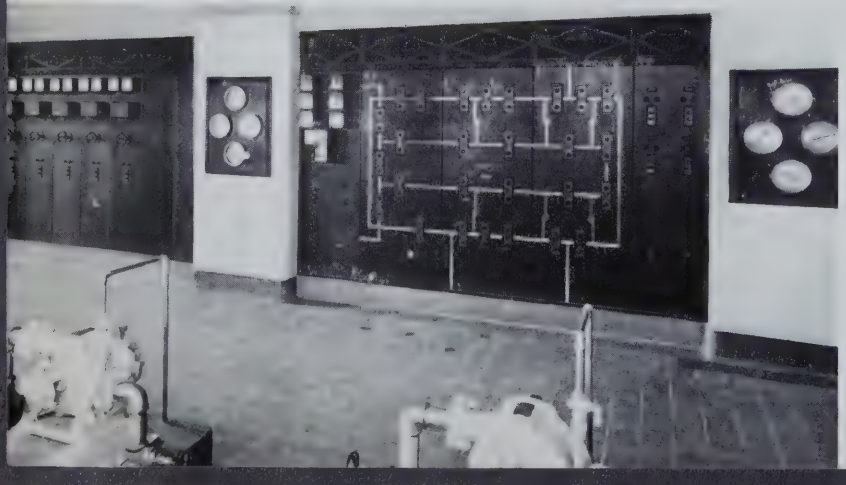
Fort Wayne has enjoyed a remarkably steady growth in population throughout its entire history and there is every reason to think that its natural advantages will continue to be a factor in the future growth of the city. The city enjoys a vigorous, healthy, industrial and commercial life promoted in large degree probably by its fundamental advantages of railroad facilities and its two independent sources of electric power.

Attention has been given in increasing degree to the quality of the public water supply. The supply must at all times be free from disease germs; it must be clear and free from any sediment that makes it visibly turbid; it should be agreeable to the taste and free from odors. Color is objectionable and for some manufacturing purposes water must be colorless. It should be free from iron, manganese and sulphur, for these impurities stain plumbing fixtures in the home, fabrics in the laundry and manufactured goods in the factory. The present-day demand is for water free from excessive hardness. Soft water is an absolute requirement in many industries and reasonably soft water is now demanded by the general consumer.

The study of the quantitative requirements of Fort Wayne has disclosed the fact that in recent years there has been water in insufficient quantity to supply the reasonable demands. The generous use of water on lawns and gardens has been discouraged rather than promoted. Pressures have been inadequate and uneven. The industrial use of city water has been comparatively small for many industries which for one reason or another have independent private sources and supplies. These and other circumstances explain the low per capita consumption of Fort Wayne in comparison with other cities in the country. Whereas the present average daily use of water is about 86 gallons per capita, cities of the size of Fort Wayne generally use in the neighborhood of 100 gallons per capita. The forecast for the future and the basis upon which new planning has been carried out provides for a growing per capita consumption up to more nearly the average for cities of Fort Wayne's size.

General view of six high service pumps in High Service Pump Room. View taken May 18, 1933.

View of West Clarifier. Showing one of 2 large clarifiers used to collect large percentage of sludge.



Motor and Valve Control Boards which control high service pump motors and valves located below high service pumps.

Sources of Water for Fort Wayne

The engineering survey of Fort Wayne's water problem gave particular attention to the possibility of securing additional quantities of water from the ground. The rock well strata were thoroughly studied over a wide area. Samples were taken and wells were explored over many square miles. The deposits of water bearing sand and gravel in the glacial drift near Fort Wayne were intensively studied and investigated, the catchment areas measured and the probable water yield calculated. The conclusion of these extensive and thoroughgoing surveys was: That all water from underground sources in the vicinity of Fort Wayne is extensively hard and much of it contains objectionable quantities of iron; that the large number of wells now being operated by the city and the industries have already developed and are now utilizing about all that the rock well sources can be expected to yield; and that the scattered gravel beds of the region will yield too little water to justify their development.

Attention was then turned to the surface waters of northeastern Indiana. No small lakes were found within reach of Fort Wayne which have watershed area enough to operate the needs of an important industrial use. Such lakes as there are have already been developed for other uses. Lake Michigan is too far away for serious consideration. The Maumee River at or below Fort Wayne would furnish water sufficient in quantity, but the use of the water of this stream for a public supply is out of the question because of the drainage of Fort Wayne itself into the river. As between the St. Marys and the St. Joseph Rivers the latter is preferable from every point of view. Its flow is more steady and dependable and its quality is much better. The population on the watershed is comparatively small and is more scattered over the entire area in small villages and rural homes.

The outstanding conclusions of all of the previous studies were that the City of Fort Wayne should develop a new source of supply, and that this source should be from the St. Joseph River; that the development of such a supply should provide for the impounding of water in adequate quantities in the river itself, the delivery from the up-river stations to the downtown plant through an aqueduct, the softening, purification and pumping of water into the distribution systems from a centrally-located station within the city. It is this plan which the city has followed and which has now culminated in the construction of the St. Joseph River dam and pumping station at the northerly end of Anthony Boulevard, the raw water supply main from this station to the downtown station, and the Three Rivers filtration and pumping station, situated at the junction of the St. Marys and St. Joseph Rivers in Fort Wayne.

Robison Park Dam and Impounding Reservoir

The collection of a supply for a city of Fort Wayne's size from a stream of this size and character requires that the flood flows of the stream be collected and held in impounding reservoirs for use during the dry weather season. In the case of the Fort Wayne project, the plan as developed has been to build two dams across the river; the upper one a large impounding reservoir, and the lower one a small intake reservoir at which point would be located the raw water pumping station. A favorable site for the second dam has been found in the vicinity of the area locally known as Robison Park. At this point a comparatively low dam can be built to impound approximately 700 million gallons of water from which it would be released down the river channel to the lower intake dam. At this writing the Robison Park impounding dam has been planned, but is not yet under construction. This unit of the city's water supply is, however, recognized as of fundamental importance in the provision for an adequate quantity of water, and its construction must be undertaken.

Mayor Wm. J. Hosey breaking ground for new Filtered Water Reservoir. March 19, 1931.

Battery of steam shovels beginning work on new Filtered Water Reservoir. March 19, 1931.

Pile drivers driving encased reinforced concrete tapered piles which support all structures in connection with new water filtration development. View taken April 17, 1931.

FINANCING

by

JOHN C. TRIER

Financing New Waterworks Project

On October 14th, 1930, the Board of Public Works entered into a contract with Hoad, Decker, Shoecraft and Drury of Ann Arbor, Michigan, to draw plans and supervise the construction of Fort Wayne's new Reservoir, Filtration Plant and Dam. At a special session of the Common Council on December 16th, 1930, there was introduced Ordinance Number 1571 calling for the issuing of $2,500,000 in bonds. The ordinance was passed December 29th. Up to this time $2,300,000 of these bonds have been issued.

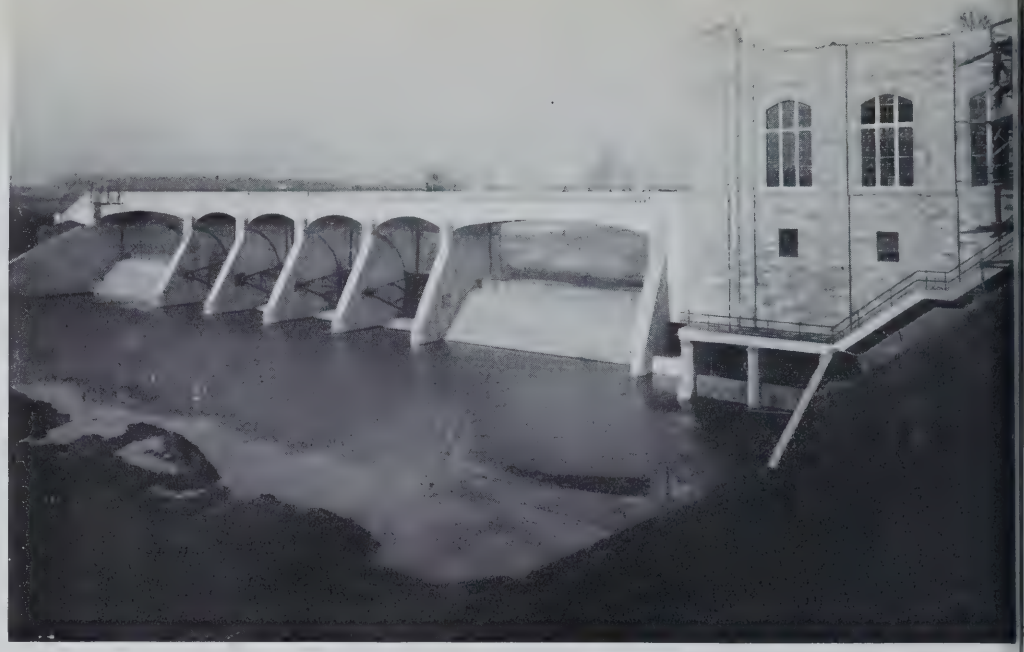
The rebuilding of Fort Wayne's Water System will not be a burden on the taxpayer. It will pay for itself over a period of 25 years. Bonds amounting to $92,000 will be taken up annually. Most of the City Water Works bonds have been sold in the larger cities throughout the country and are rated by bond experts as an excellent investment. Fort Wayne not only owns its Water Plant but has successfully operated "City Light & Power" for many years. Comparison will show that water and light rates here compare favorably with the lowest in the country.

Building of the new water works during the last three years was a fortunate thing for the community. It came at a time when the unemployment problem was acute, and it no doubt relieved the local situation in a great measure. Contracts were let at a time when the prices of building materials were the lowest in years and years. It has been estimated by capable engineers that Fort Wayne taxpayers saved more than $300,000 by building when they did. Early next year the National Board of Fire Underwriters will make a survey of the local water situation and it is hoped that there will be a further reduction in mercantile fire insurance rates. If this is brought about it will mean a tremendous saving to the community as a whole.

It was back in 1881 that Fort Wayne began delivering water to its citizens, and with the exception of a few days during the flood of 1913 the city's water plant has been in continuous operation for a period of 52 years. The growth of Fort Wayne during these years has been very substantial. From a population of 27,000 it has increased to 120,000 and we are today Indiana's second city.

The water works plant was originally financed by the issue of $246,000 in bonds. Today the assets of the department amount to $5,862,349.76. Comparing it with other businesses in the city it rates as one of the largest.

Fort Wayne is now supplied by 17 electrically driven pumping units from 37 rock wells varying in depth from 75 to 650 feet. These wells are located in various sections of Fort Wayne. The water plant has more than 28,500 meters or customers which will give one an idea as to the amount of work necessary every month in looking after billings and collections. The lengths of pipe lines throughout Fort Wayne reach the grand total of 265 miles. Fire hydrants maintained and serviced by the department total 1578.



General view of St. Joseph River Dam and Pumping Station as it nears completion.

Installation of river crossing of the 42-inch steel raw water main which connects St. Joseph River Dam with Filtration Plant. This river crossing was constructed on dry land and floated into place by means of pontoons and lowered into its proper position.

Showing the progress of the lowering of the river crossing into position.

FUNCTIONS

by

W. C. HOAD

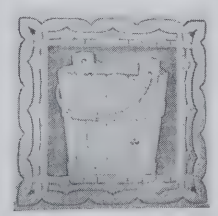
St. Joseph River Dam and Pumping Station

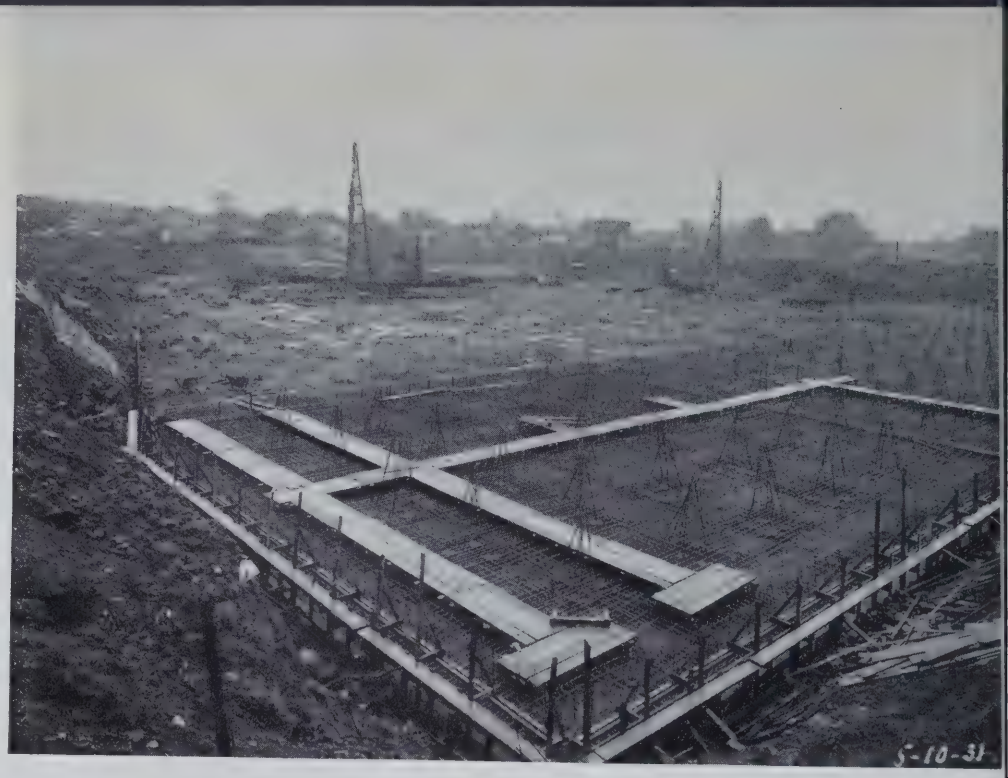
The St. Joseph River dam and pumping station is situated at the northerly end of Anthony Boulevard and the St. Joseph River. The purpose of this unit is to impound a comparatively small volume of water available to the suctions of the raw water pumping equipment. It has been planned that the dam shall raise the water level in the river under normal conditions about 10 feet, which will form a lake extending upriver about to the site of the Robison Park dam. The dam proper is about 200 feet long and consists of two overflow sections, each 50 feet long, one at each end. Between these are four Tainter gate sections, each with 22 feet clear opening stopped by swinging steel gates. A foot bridge carrying the gate hoist mechanism extends entirely across the dam. The pumping station, situated at the southeasterly end of the dam, houses the raw water pumping equipment, a hydro-electric turbine and auxiliary equipment. Four pumping units are installed at the present time. Three of these units are equipped with two-speed motors so that they may be operated at two different discharge capacities; the large unit at 21,000 g.p.m. or at 12,600 g.p.m.; the intermediate unit at 18,200 g.p.m. or at 10,500 g.p.m.; and the smallest unit at 15,400 g.p.m. or at 8,400 g.p.m. The fourth unit is equipped for constant speed to deliver 7,000 gallons per minute. Different combinations of these units will provide various pumping rates from about 4,000 gallons per minute up to 22,000 gallons per minute, with conditions of different pond levels on the suction side and delivery levels on the discharge side at the Three Rivers plant.

The hydro-electric generator is a standard vertical water turbine driving an electric generator with a rated power output of 235 h.p. The power from this source will be applied so far as is available or needed to the operation of the raw water pumping equipment. Any excess power beyond this need will be switched to the transmission lines of the City Light and Power Plant. Any shortage of power for the operation of the raw water pumping equipment from this source will be supplied by the City Light and Power Plant.

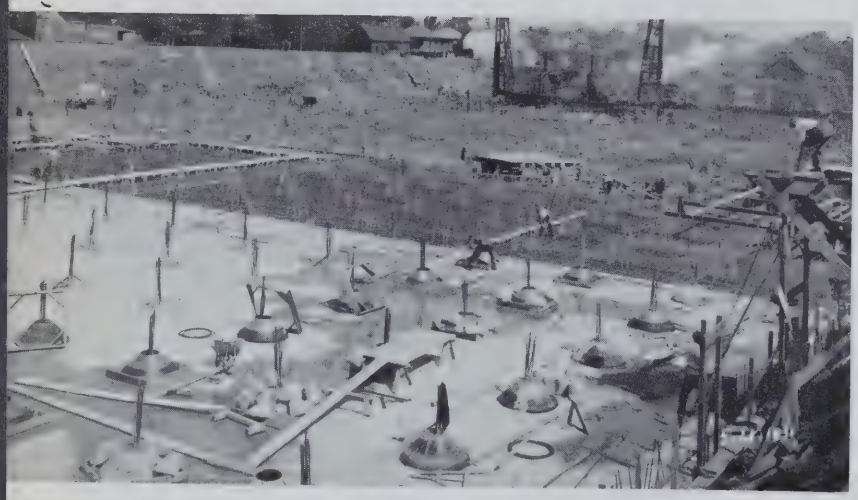
Raw Water Supply Main

The raw water pumps at the St. Joseph pumping station deliver into the raw water supply main, a 42-inch Toncan iron plate pipe connecting the up-river station with the Three Rivers filtration and pumping station. This line is laid along Springfield Avenue, Parnell Avenue, the St. Joseph River and in the River Drive to the downtown plant. It is equipped with gates at occasional points, drainage and blow-off lines at low points, air relief valves at high points and access manholes at frequent intervals. Provision is made in the construction of the line for a parallel line to be laid at some future time when the increased consumption of the city shall require it. Space has been allowed throughout the entire length for this future line and cross-over connections have been built in the line already laid. The present line has a carrying capacity up to 40 million gallons of water per day dependent of course on the pressure applied to it by the raw water pumping equipment.

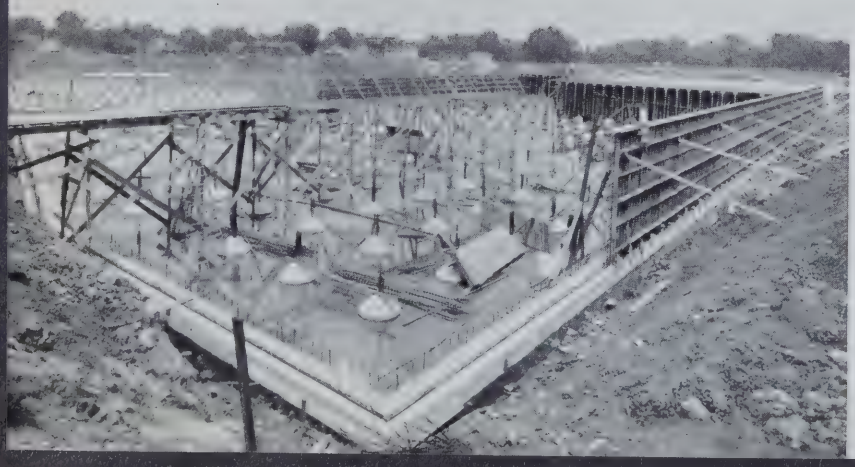




Looking northeast, showing heavy floor reinforcement and reinforced steel for piling projecting through floor. View taken May 10, 1933.



Floor of reservoir with the many column bases in place. Note reinforcing steel of piling projecting through top of bases. View taken May 21, 1931.



Progress view of walls and roof slab. Also division walls dividing reservoir into north and south reservoirs.

Three Rivers Filtration and Pumping Station

The raw water supply main discharges its flow at the Three Rivers filtration and pumping station. This plant is situated at the junction of the St. Joseph and St. Marys Rivers where they form the Maumee in the central part of the city. Here the water is softened, filtered, sterilized and pumped out into the system of underground mains serving all parts of the city. This plant is the largest structural unit of the entire water works system.

Three Rivers Plant Functions

From the raw water supply main the water may first be passed through aerators. These aerators consist of spray nozzles arranged in two separate basins. They operate effectively over wide ranges of flow and are so designed as to throw the water out in thin sheets thereby providing intimate contact with the air. The water falling from the aerator nozzles is collected upon a sloping concrete floor from which it flows into piping carrying it to the primary mixing tanks. Piping arrangements are provided so that the aeration basins may be by-passed if desired.

The softening of the river water is accomplished by treatment with a commercial grade of ordinary quicklime. For other purposes small amounts of other chemicals may be required. Chemicals and other supplies for the plant may be received in the unloading room in freight cars or in motor trucks. The handling of all chemicals into the plant and through to the point of application to the water is done by a pneumatic conveying system. Essentially it consists of a system of closed piping with intake nozzles on flexible hose lines arranged for use in railroad cars. A partial vacuum is applied to this system of piping by which means chemicals are drawn in and lifted to air filters and separators located in the highest part of the chemical building. Here the dust is filtered from the air, the vacuum is released and the chemicals dropped to any desired one of several storage bins. Two large concrete bins have a holding capacity for lime of 200 tons each. Two smaller steel bins have a holding capacity for lime of 24 tons each. From the smaller bins the lime flows by gravity to the hoppers of feeding machines. These machines, operated by small motors, feed the lime or other reagent into solution hoppers at any predetermined rate. In the solution hoppers the reagent is dissolved or placed in suspension in water in which form it is then discharged into the flowing stream of raw water in the primary mixing tanks.

The primary mixing tanks are equipped with motor-driven vertical-shaft paddle mechanisms by means of which the water is violently stirred thus accomplishing a thorough mixing of the applied reagents with the raw water. The water to which the reagents have been added then flows into either or both of two batteries of coagulation tanks.

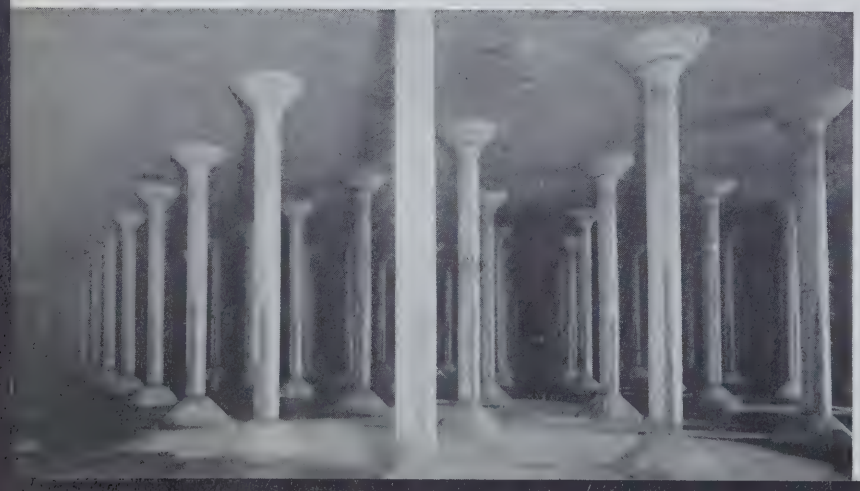
Each battery of coagulation tanks consists of a series of three, approximately square, deep tanks in which are mounted motor-driven paddle mechanisms somewhat like those of the mixing tanks. In the coagulation tanks, however, these mechanisms are operated much more slowly, their purpose being to promote a thorough but gentle stirring of the water. During the time which the water requires to flow through the three coagulation tanks, approximately 45 minutes at the nominal rate of 24 million gallons per day, the interaction of the applied reagents with the mineral constituents of the raw water is accomplished. These reactions result in the formation of insoluble precipitates which are later to be removed from the water by a settling process. It is not desired, however, that settling shall take place in the coagulation tanks. From the coagulation tanks the flowing stream of treated water is discharged into clarification tanks.

These tanks, two in number, are provided to settle out the bulk of insoluble matter resulting from the interaction of applied chemicals with the mineral constituents of the raw water. Each

40,000# UPLIFT TEST
ON
ONE STANDARD RAYMOND CONCRETE PILE
LENGTH of PILE 16' 7"
AMOUNT of UPLIFT 0.00"
CITY of FORT WAYNE INDIANA
FILTERED WATER RESERVOIR
HOAD, DECKER, SHOECRAFT AND DRURY ENGINEERS

View shows three piles, the center pile being tested for uplift by means of powerful oil jacks.

Completion of concrete work for 20,000,000 gallon Reservoir showing heavily reinforced concrete top. This Reservoir now has three feet of earth over the top and is used for park purposes. View taken Sept. 12, 1931.



Interior view of Reservoir showing the many supporting concrete columns. View taken Sept. 18, 1931.

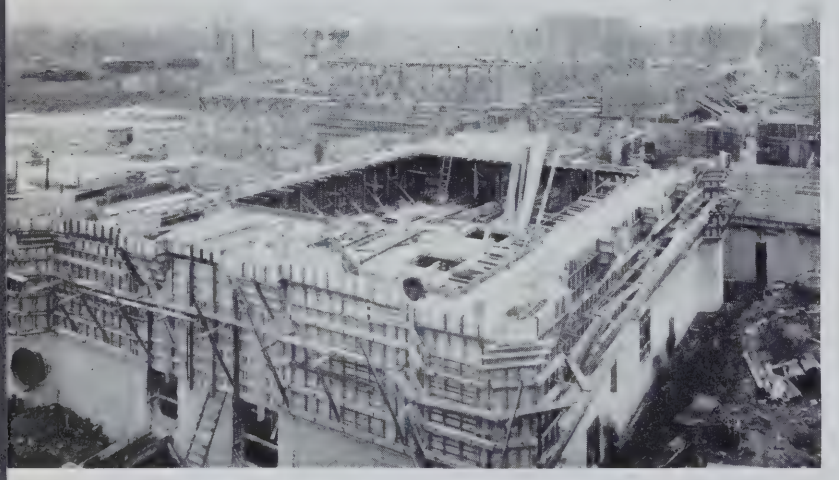
tank is equipped with a motor-driven scraper mechanism by means of which the settled precipitates, or sludge as it is commonly termed, can be continuously plowed to a central sump. From this sump the sludge is pumped to the drain. The clarified water, now containing but a small part of the chemicals applied to it and the mineral constituents originally carried by it, flows into settling tanks.

These tanks, much larger than the clarification tanks, take out practically all of the precipitate not removed in the clarification tanks. These tanks have a detention period of about 4 hours between the water entrance and exit. The settled material collected in the bottom of these tanks may be drawn or pumped to waste. The water, from which practically all of the applied reagents and the original mineral constituents have now been removed, flows next into carbonation tanks.

In the carbonation tanks the water, during a flowing period of about 9 minutes, is treated with carbon dioxide gas. This gas is generated in the boiler room of the plant by a coke-gas process. The coke gas is burned under the plant-heating boilers in such manner as to produce a stack gas containing carbon dioxide. This stack gas thoroughly cleansed is compressed and discharged through diffuser piping in the bottom of carbonation tanks. This process supplies, as a by-product, practically all the heat for the station buildings. Two small ordinary heating boilers are provided to meet peak loads beyond the capacity of the coke gas plant. In the carbonation tanks the carbon dioxide gas bubbles up slowly through the 14-feet depth of water. This process completes the softening reaction and serves to improve the appearance and taste of the water. From the carbonation tanks the water next flows to the filters.

The filters consist of ten units, each having a nominal capacity of 2.4 million gallons per day. Each filter unit consists essentially of a concrete box, on the floor of which is laid a carefully designed system of under-drainage piping. Over this is laid a bed of gravel 18 inches in total thickness consisting of five graded layers, the largest on the bottom consisting of gravel stones ranging from 2-inch to 1-inch in size and the finest on the top ranging from $\frac{3}{16}$-inch to less than $\frac{1}{10}$-inch in size with intermediate gradations between. Above the gravel bed is a bed of carefully graded filter sand having an approximate uniform size of about one-fiftieth of an inch. The water flows into the filter box above the sand and filters slowly downward through the sand and gravel layers and is collected in the underdrainage system beneath. The filters strain out any vestige of impurity still remaining in the water. Under normal conditions a filter becomes clogged with impurities after an operation period of 10 to 15 hours and it becomes necessary to cleanse it. This cleansing is done by a back-washing process in which clean water is forced backwards and upwards, first through the underdrainage system then the gravel layer and finally the sand layer. The rates of flow of the backwashing are carefully controlled so as not to disturb the gravel, but sufficient velocity is provided to lift the sand and scour it thoroughly of its impurities. The dirty wash water above the filters is collected in troughs mounted above the sand bed, through which it is discharged to waste. After the normal filtering operation, the filtered water collected in the underdrainage system flows through underground piping into the filtered water reservoir, a large concrete tank holding approximately 19 million gallons and situated underground west of the Three Rivers filtration and pumping station.

View shows later progress on the Filtered Water Reservoir. View taken June 27, 1932.



General view of construction on the Filtration Plant showing pump room in the foreground. View taken April 8, 1932.

Aerial view of the Filtration Plant, showing in addition the Pump Room, Office Corridor and Filter Building. View taken April 28, 1932.

STRUCTURAL FEATURES

Three Rivers Plant

The site of the Three Rivers station was originally an alluvial flood plain of the river system. In times past, it had been used as a source of sand and gravel for construction operations. More recently the gaping holes had been used as dumping grounds for junk and city debris of every sort. The site, however, possessed unusual advantages from the standpoint of its central location and the possibility of its artistic treatment to justify its use for this station. Careful exploration of the soil disclosed foundation conditions requiring special attention for the support of massive structures covering heavy equipment. Only by supporting every element of the plant upon deeply driven piles has it been possible to utilize this site.

One of the most unusual features of this plant is the construction of the settling tanks in two stories, one mounted directly above the other. This type of design was found to be most economical especially when structures were to be founded upon piles. The lower story of the settling tanks has a depth of about 12 feet. Above this is a watertight concrete floor supporting a second-story tank providing for a settling tank of about the same depth. Over part of the area of these tanks a third deck serves as the aeration basin. Manholes are provided for access to any of these levels.

The plant has been so arranged that there are no openings in the outside walls at a level below the highest expected stage of the rivers in front of the plant. During such times as the rivers are in flood stage and the ground water level is high, the plant will tend to float. To guard against this, all of the basement floors are designed to withstand upward water pressure and these floors have been securely tied with steel bars to the piling underneath. The piles, therefore, serve two functions, that of holding the plant up and in high river stage that of holding the plant down.

Unlike many water plants, the buildings forming the water plant are all connected under one roof. This makes for ease and convenience in operation. In addition to this, all important points in the plant are connected together by means of an inter-communicating telephone system. When one considers that the superintendent's office is about one-eighth of a mile from the boiler room horizontally and 50 stair steps vertically, the convenience of this telephone system can be realized.

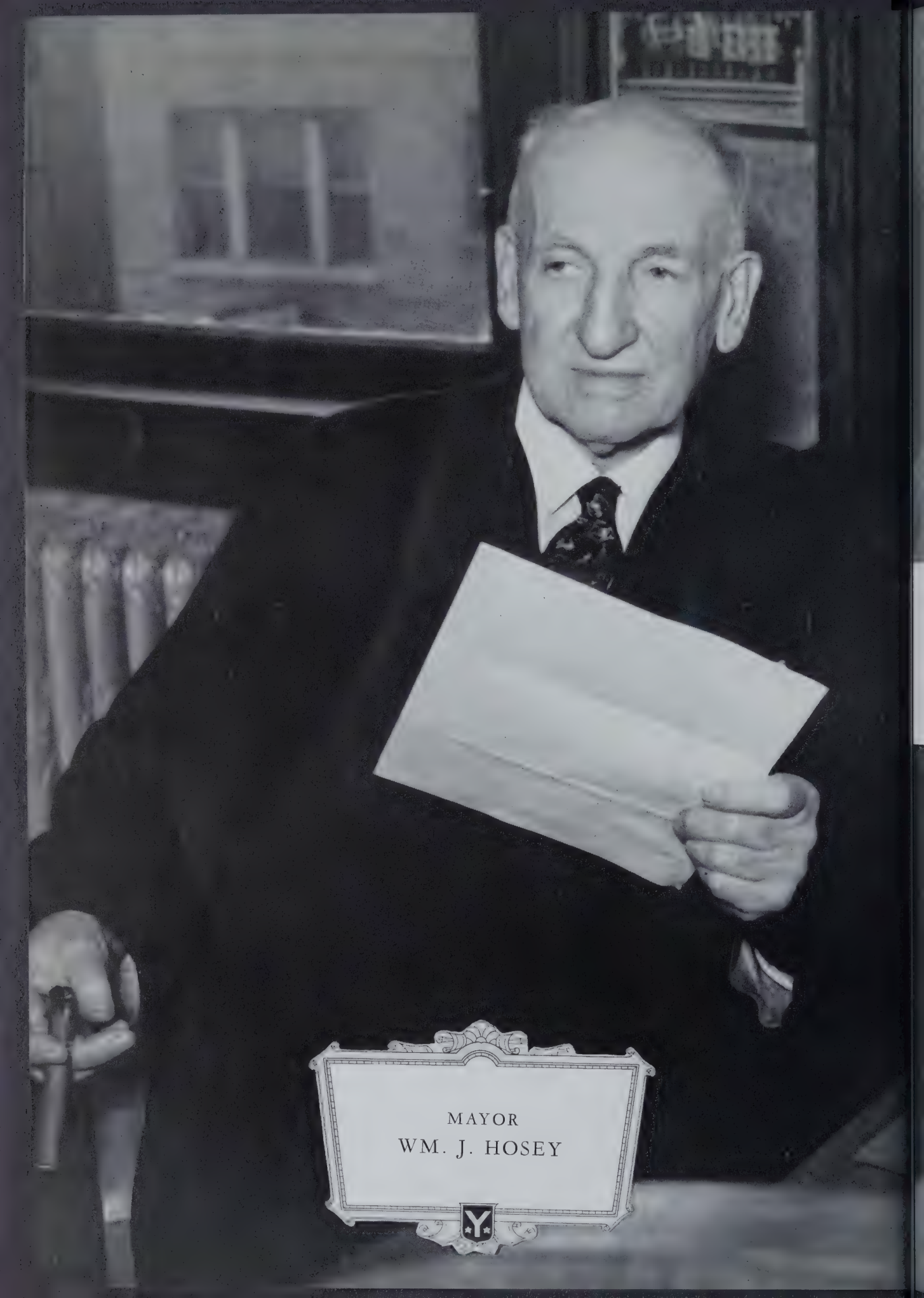
The piping leading to and from the main pumps is so arranged and equipped with electrically-operated valves that any pump may be cut out of service almost instantly without the necessity of stopping any other main or impairing the pumping of water into any one of the three mains leading from the plant.

Two separate and independent sets of underground electric cables bring power into the plant from the City Light and Power Plant. Each cable can supply the 3,200 horsepower required by the plant motors, so that if one cable should be injured, the plant would be supplied by the other cable without interruption to service.

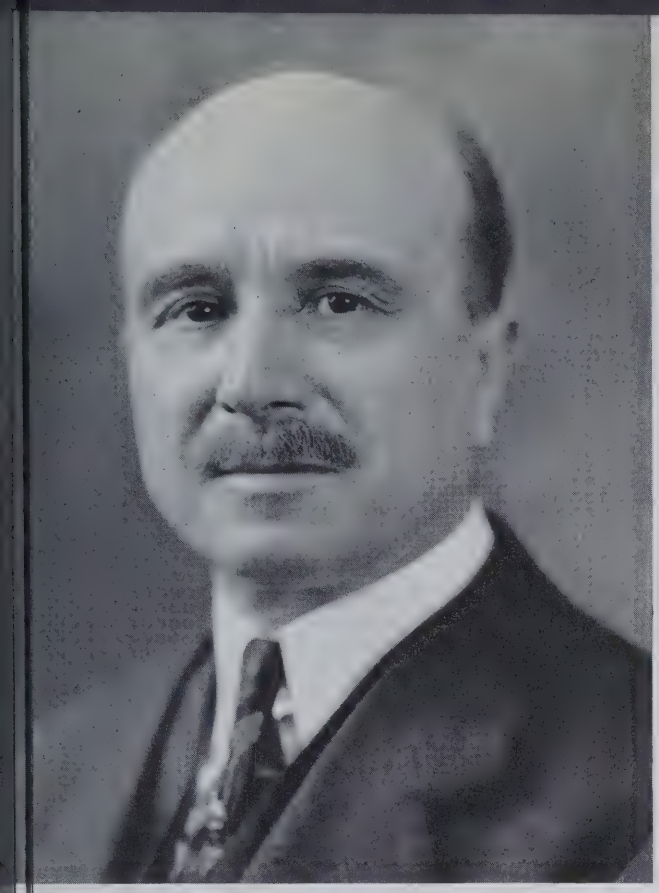
St. Joseph River Dam

The St. Joseph River Dam is built on a gravel river bottom. In order to prevent the seepage of water underneath the dam and the danger of undermining its foundations, a row of steel sheet piling has been driven down to a clay layer all the way across the river. These piles are locked together and form a sheet of steel through which no water can percolate.

All of the structures above ground are built with an exterior of Indiana limestone. The architectural treatment denotes the nature and functions of the plant through its massive elements and dignified lines.



MAYOR
WM. J. HOSEY

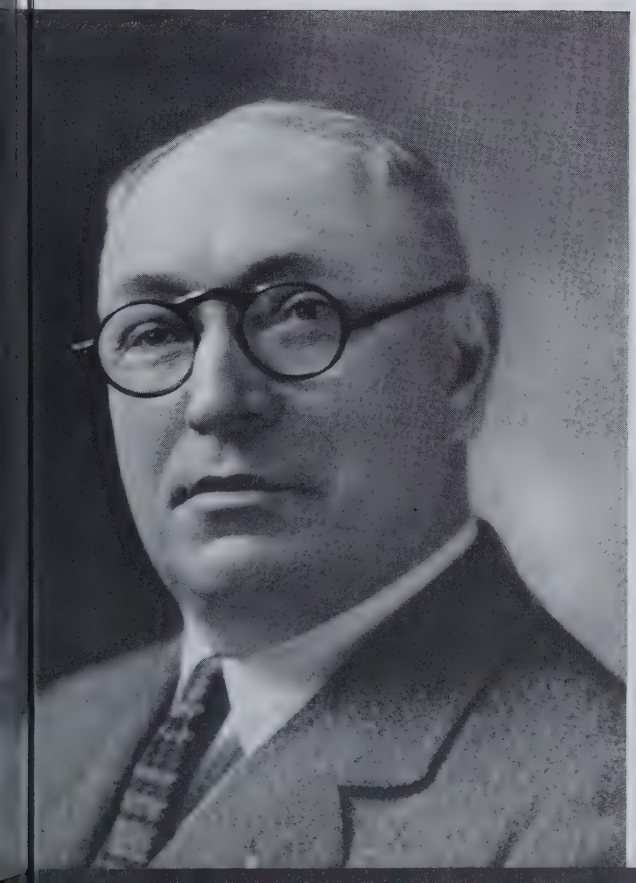


JOHN C. TRIER

DAVID ERWIN

BOARD OF PUBLIC WORKS

C. A. RAMSEY



SCOTT SNYDER, *Sec'y*

FORT WAYNE'S MUNICIPALLY OWNED WATER WORKS SYSTEMS FROM 1879 TO 1933 COVERING A PERIOD OF FIFTY-FOUR YEARS

By Mayor Wm. J. Hosey

It is not my purpose to relate how the City got into the Water Works business in those early days. That would be a very long story and also a very interesting one, but time or space will not permit its recital now. Suffice to say that about the first of the year 1880 the city found itself the owner and operator of a $300,000 water works plant. "How was this $300,000 obtained to finance the plant?" the reader will ask. It was obtained by issuing City interest-bearing bonds to the amount of $270,000. Some $30,000 tax money was added to this bond money which paid for the plant at that date. "Well", I think I hear someone ask, "was this $300,000 of taxpayers' money ever paid back during the past fifty-four years?" The answer to that very pertinent question is positively, "Yes." The *best* answer to the question however, is as follows:

Twenty-five years after the original $300,000 plant was put into operation (in 1879 or about 1905) during the term of the late Mayor Berghoff, a fact-finding investigation was gone into for the purpose of determining the true financial status of the City Water Works and its relation to the taxpayers of the City. The following facts were ascertained:

That the $300,000 Water Works Plant of 1879 had expanded into a $1,500,000 plant in 1905.

That the plant at that time could not be replaced or duplicated for one and one-half million dollars.

That during the twenty-five-year period the greater part of the $1,500,000 plant of 1905 was paid for out of water works revenues and not out of taxes.

That the value of public water service from 1879 to 1905 consisting of fire protection or hydrant rental, water services to all the public schools, city hall, fire houses, city parks, green houses and city barns, the flushing of streets and sewers, etc., would aggregate a greater sum than all the money paid in taxes on account of the Water Works Project.

Such was the result that "fact-finding" investigation in 1905 found. In addition, the Water Works of 1905, valued at $1,500,000, was practically paid for and had cost the taxpayers nothing. Such debt as the city owed on account of it was purely negligible.

A similar checkup on the City Water Works today will show the same results.

Now, in regard to the new $2,500,000 filtration works, storage reservoir, up-river dam and pumping station for which bonds were issued, you may ask how those bonds are going to be paid. Well, in answer to that question, I will say that those bonds will be paid out of the revenues of the water plant, and not out of new taxes.

In conclusion let me say that all the people of the City have to do is to continue to pay their water bills, and at the present schedule of rates, and if they do that they can stop worrying about taxes and how the new bonded debt will be paid.

Signed,

WM. J. HOSEY,

Mayor.

WM. FRUECHTENICHT
City Attorney

HOWARD BENNINGHOFF
Ass't City Attorney

J. L. SHIELDS
Sec'y Waterworks

CHAS. B. YOBST
Sup't Waterworks

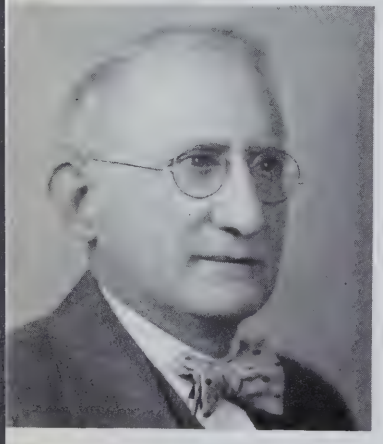
JULIAN F. FRANKE
Comptroller

MICHAEL BURNS
President

CHARLES H. YOUNG
Councilman
at Large

FRANK A. WYSS
Councilman
at Large

CITY COUNCIL



LOUIS C. LANGARD
1st Ward

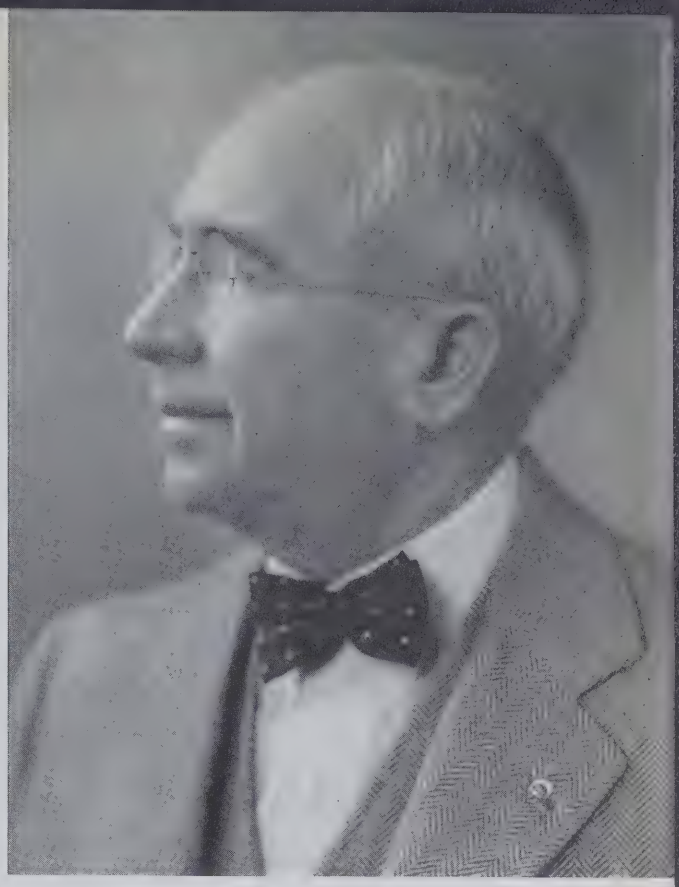
EDWIN C. LINDENBERG
5th Ward

LOUIS J. VOORS
2nd Ward

GEORGE A. DINNEN
3rd Ward

AUGUST WEISENBERGER
4th Ward

ALBERT MORAN
Councilman
at Large



LOUIS SCHMOE
Vice President

JACOB HARTMAN
Councilman
at Large

CITY COUNCIL

EDWARD H. FISHER
6th Ward

CHAS. F. HESS
11th Ward

JULIAN J. PERREY
8th Ward

ANDREW J. DEITSCHUL
9th Ward

CHAS. F. LENZ
10th Ward

View looking west toward Filter Building and Tower, showing landscaping.

West Aeration Basin during process of operation.

Gatehouse of Filtered Water Reservoir. Note piling sample display.

ARCHITECTURE

By

VICTOR A. MATTESON, A. I. A.

The Waterworks Building

The Three Rivers Park Water Works differs in one respect from many such projects built in the past in that it has successfully combined a strictly engineering problem and an architectural problem without sacrificing any important consideration from either the architectural or the engineering point of view. This most satisfactory result has been accomplished by the intimate co-operation of engineers and architect, each with consideration for and familiarity with the reasonable requirements of the other. The success of the project could not have been assured, however, even by these conditions if the Mayor and Board of Public Works had not given these ideas their hearty approval and support. We believe that there is complete unanimity of agreement that the results are satisfactory in that the plant will furnish pure water in ample quantity at reasonable cost, and at the same time afford a worthy addition to the architecture of the city of which the citizens may be proud. It should be pointed out that the slight extra cost of a structure such as this over the cost of a factory type building amounts to but one or two per cent of the total cost of the entire project.

The exterior design of the building is not "modernistic," but an adaptation of the spirit of the Gothic to modern requirements. There is little in the nature of ornament. The fact was kept in mind that the majority of people would view the building from a distance. The location was chosen among the few available suitable sites with a view of the economical distribution of water, access to supplies and power, and appearance. Surely no more beautiful spot could be wished for than the Three Rivers Park site, affording as it does a splendid view from across the rivers in any direction, and a location near the center of the city. In designing the plant the engineers and the architect gave careful consideration to the site. A plan almost completely symmetrical about a north and south axis resulted with the principal facade to the south, with the mechanical and chemical portions of the building to the north. Most of the pleasing architectural effect is secured by a careful study of mass and proportion, light and shade, and color. The large central tower which encloses a steel water tank dominates the group,—for the plant may be considered as a connected group of buildings. Some detail and carving will be found in connection with the tower in which is located the main entrance to the building. Elsewhere about the building will be found some interesting carved panels, nearly all different, depicting some event in the history of water supply. While the effect is rich and massive, befitting the purpose of so important a building to a community, the design is really one of extreme simplicity, and there is a conspicuous absence of mouldings and cornices. It expresses a well proportioned mass of stone walls and tower, with red tile roofs, framed with green trees, grass and shrubbery. A landscape planting scheme has been adopted which follows closely the architect's original sketch of the building as viewed from the river, and adds materially in the pleasing effect. The building is well adapted to a suitably designed flood light scheme.

Entering the building through a deep stone portico at the base of the tower, one passes through a stone walled vestibule into an octagonal lobby. This room is strictly Gothic with Indiana limestone walls and Gothic columns supporting a lofty ribbed groined vault ceiling. This high vaulted ceiling is made possible by the need for height for the elevated tank above it. The tower is strictly utilitarian, as it hides and protects the steel tank. The octagonal plan of the lobby, located in the center of the square tower, gives opportunity for locating in the corners, public toilet rooms, janitors' room, staircase and pipe space, all of which open from the lobby. In the center of this room is located a stone well, lined with white tile, through which the pure water of the plant is constantly flowing, giving a visual demonstration of the product. This well is lighted by a daylight neon tube system. The floor of the lobby is paved with variegated color slate flag stones with random joints.

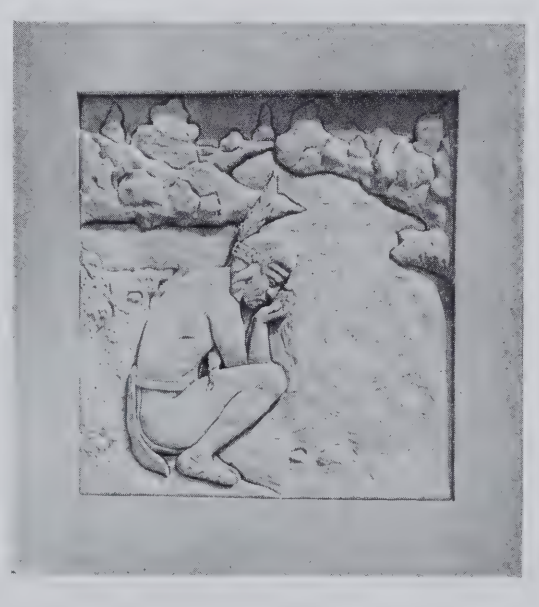
Excavation for the Chemical Building and Settling Tanks showing reinforcing steel of concrete piles extending from ground. View taken Jan. 24, 1932.

Looking south over the concrete floor slabs for the Chemical Building. View taken March 1, 1932.

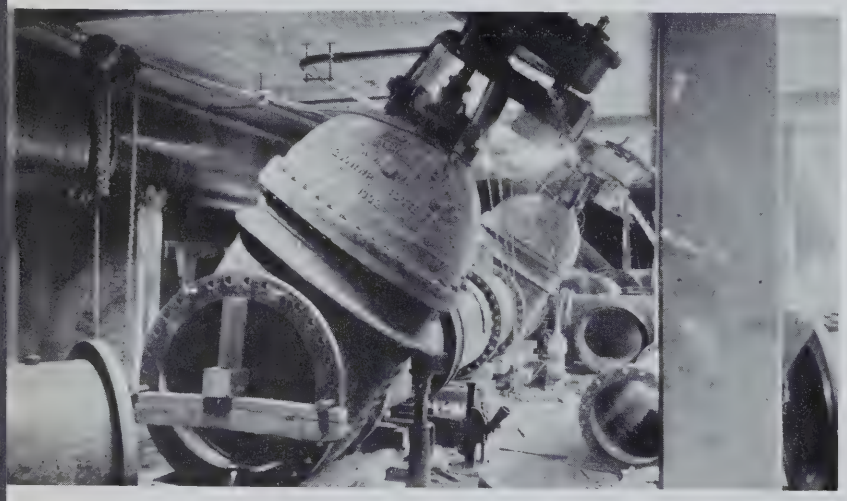
Placing concrete in the floor of the East Settling Tanks. View taken March 15, 1932.

Passing through the lobby toward the north, one enters a well lighted transverse corridor, running east and west, also with stone walls. From this corridor all departments of the plant are accessible. Opening into it are the administrative offices. A staircase leads to the departments on a lower level. Here are located the necessary gauges and indicators giving necessary technical information. To the right, at the end of the corridor is the entrance to the Filter Room. To the left, (west) at the opposite end of this corridor is the entrance to the visitors' gallery of the main pump room. On the center axis of the building opening into this same corridor opposite the lobby, is another corridor which connects to the laboratories, and continuing north one passes the settling basins, the aeration fountains, and finally at the north end one enters the chemical treatment plant, where the water softening and other processes are conducted. This building is several stories in height. At the top is located the air lift apparatus for raising the chemicals, principally lime, from the freight cars to the storage bins, from where by gravity it is run to weighing and measuring hoppers on the floor below. From these the chemicals are distributed to various mixing devices where the softening and purification processes are conducted. The basement of this building contains the heating plant and carbon dioxide generators.

Entering the Filter Room from the transverse or communicating corridor, one finds oneself in a lofty gallery lighted from windows above massive arches, which separate the gallery from the huge filters on either side. The ceiling of this gallery is designed to give the effect of a stained paneled wood ceiling with wood beams, but actually it is fireproof like all the rest of the building. The walls of the filter inclosure are faced with tile, as well as the piers which support the roof of the gallery. This Filter Gallery is, perhaps, with the exception of the lobby, the most attractive part of the building in appearance. The Pump Room is a large well lighted room occupying the entire west wing of the front of the building. It is surrounded with an interior balcony, and contains a visitors' gallery opening to the west end of the main corridor. This room, like the filter gallery, was originally designed with a stone wall treatment in Gothic style, to harmonize with the walls of the lobby and the connecting corridor. The floors are of red quarry tile. A large crane is provided, capable of handling all the machinery in this room.



Reinforced concrete framework supporting 100,000 gallon wash water tank enclosed by tower. View taken July 8, 1932.



View of electrically operated gate valves located in the Pump Room Pipe Basement. View taken July 21, 1932.

View of the progress o the stone work for the main entrance to building. View taken August 4, 1932.

CONSTRUCTION

by

R. L. McNAMEE

Clearing of Site

The site on which the plant is built, originally a junk heap, required the expenditure of considerable labor in clearing it previous to construction operations. Some of the larger pieces such as machine foundations, heavy steel, and coils of cable were bodily moved from the building sites and buried on other parts of the grounds. Even so, considerable difficulty was encountered in later construction operations particularly in driving piles.

Excavation

The principal difficulty in excavating the site lay in the necessity of constant pumping of water from the excavated areas. The nature of the sub-surface materials, made very porous by the buried junk, permitted unusual quantities of ground water to percolate through from the river. At the Three Rivers station site, nearly 90,000 cubic yards of material was excavated. In order to backfill around structures and to grade up to finish lawn levels around the buildings, nearly 200,000 cubic yards of earth were moved, including a large quantity brought in from outside.

Pile Foundations

The unstable nature of the sub-soil beneath the level of the structures required the support of all parts of the plant upon piling. In all, approximately 8,000 piles were driven on the Three Rivers site—a total length of nearly 150,000 lineal feet. A steel shell encasing a driving mandrel was first driven down to the required resistance. The mandrel was then withdrawn, steel reinforcement bars were placed within the steel casing and concrete was then poured, filling the casing to the desired level. Occasionally throughout the program of the pile work a pile was selected and tested by the engineers for both its bearing and its uplift value. In the testing for bearing, piles were loaded with 60 tons of cement in sacks and held under observation for a period of hours to determine settlement, if any.

Because these piles serve also to secure structures from flotation during periods of high ground water levels, they were also tested for uplift values. For this test, oil jacks were used in an attempt to lift the pile upward from its position. All piles tested were found to conform to the required loading values. To determine the actual holding down power of these piles, one pile was driven in an area outside of any structure and later tested for uplift value. It was found to require 43 tons of uplift to remove this pile from the ground. This particular pile has been preserved and is now on view near the entrance to the gatehouse of the filtered water reservoir.

The St. Joseph River dam and pumping station is supported on approximately 1,100 wood piles—a total length of about 21,000 lineal feet.

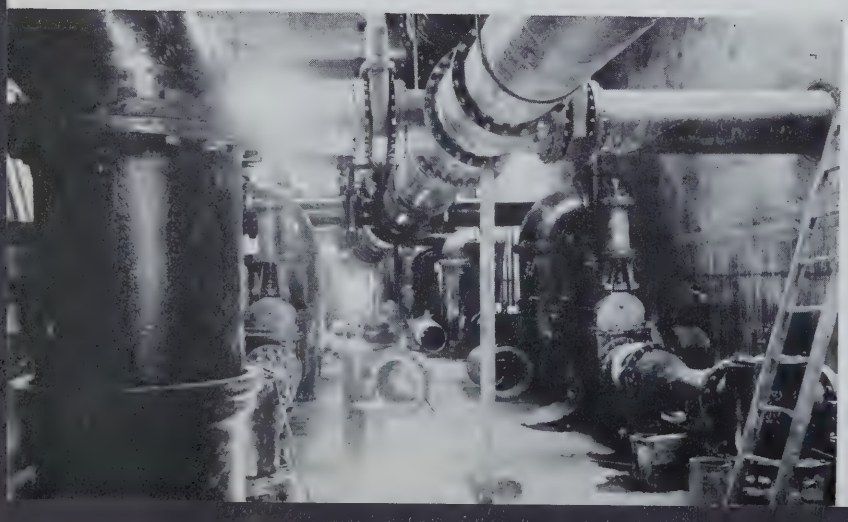
Concrete

All structural elements of buildings, basins and tanks below ground are built of reinforced concrete. For these purposes where walls and floors must be water-tight, especial attention was given to design of concrete mixture. This concrete was required to not only have the necessary structural value (3,500 pounds per square inch), but also extreme density against water leakage. The tests of concrete, mentioned elsewhere in this booklet, showed that the requirements were more than satisfied by the concrete placed in the structures. The framing of the tower superstructure is of reinforced concrete columns and beams with a facing of limestone. Other parts of the superstructure have walls of limestone backed with brick masonry and finished on the interior generally with wall tile. Roof framing in general is of steel.

The concrete placed in the Three Rivers station alone would have built a pavement 20 feet wide and more than 10 miles long. The reinforcement steel in this concrete amounted to nearly 3,000 tons. All building contractors on these jobs used the most modern methods of concrete mixing, transportation and placing. The preparation of the concrete mixture was under the constant control of an experienced engineer who carefully weighed all cement, sand, gravel and water entering into the mixture. Concrete mixers were operated for definite lengths of time required to secure a thorough mix. Concrete was transported from mixer to point of deposit by various means suited to the conditions. For those parts of the structures at some distance from the mixer, concrete was hoisted and discharged in inclined chutes. In other cases concrete was wheeled in buggies from mixer to point of placement. Careful attention was given in every place to segregation of concrete aggregates during transportation.

View of piping between the Filtered Water Reservoir and pipe gallery of the High Service Pumping Station. Taken April 28, 1932.

Looking west along Raw Water Line and Emergency Intake. Valve Chamber in foreground. View taken August 11, 1932.



General view of progress of filter gallery piping. View taken June 24, 1932.

The desired forms and shapes of floors, walls, columns and beams were built in advance of wood form work. The very nature of the complicated water plant structure required unusual skill and care in forming. In particular much attention was given to the securing of a smooth interior face of concrete work especially in those parts of the buildings where no other facing was used.

After the fluid concrete had been placed in forms, it was thoroughly and continuously rammed and rodded to displace all trapped air and to secure a dense structural unit. In some cases this was done by men working from the upper surface and in others by pneumatic tampers operating against the outside of the form being filled. An inspection will evidence the success of these efforts in the fine texture of the finished work.

Cast Iron Pipe Work

In a plant of this nature, the installed equipment and piping constitutes a veritable heart and arterial system. The structure is in fact simply the housing for these important operating elements. The basement galleries of the plant contain a maze of water, gas and electrical conduits varying in size from $\frac{1}{8}$-inch in diameter to 48 inches in diameter. Many valves, gates and cross connections serve to direct the flow through the plant. In the Three Rivers station alone the large piping amounts in weight to over 110 tons. The raw water supply main, bringing the water from the St. Joseph River Dam down to the Three Rivers station, is built of iron plate pipe weighing over 1,100 tons. Notwithstanding the apparent intricacy of the piping systems, they are so designed that in the event of a break any may be readily removed and replaced.

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Building

Practically all usual building trades were utilized in the construction and finishing of the plant buildings—brickmasons, stonemasons, tile setters, marble setters, terrazzo finishers, painters, decorators, furnishers, etc.

Building Finishes

The architectural finish of the new Three Rivers station has afforded the architect an unusual opportunity to use the nationally-known product of our state—Indiana limestone. City officials gave much thought to the selection of an artistic yet durable color and texture of stone, and the wisdom of their choice is well expressed in the pleasing ensemble of the structures as a whole. At the Three Rivers station alone the area of limestone wall surface amounts to over 75,000 square feet.

Equipment

Much of the special equipment in the plant was purchased direct from manufacturers and installed in the building by them. The purchase of such equipment was made in each case on the basis of the price bid and a careful evaluation of the performance guarantees by the manufacturers. During the present period of starting and tuning up of the plant, engineers from these manufacturers have been in attendance in connection with the operation of their equipment.

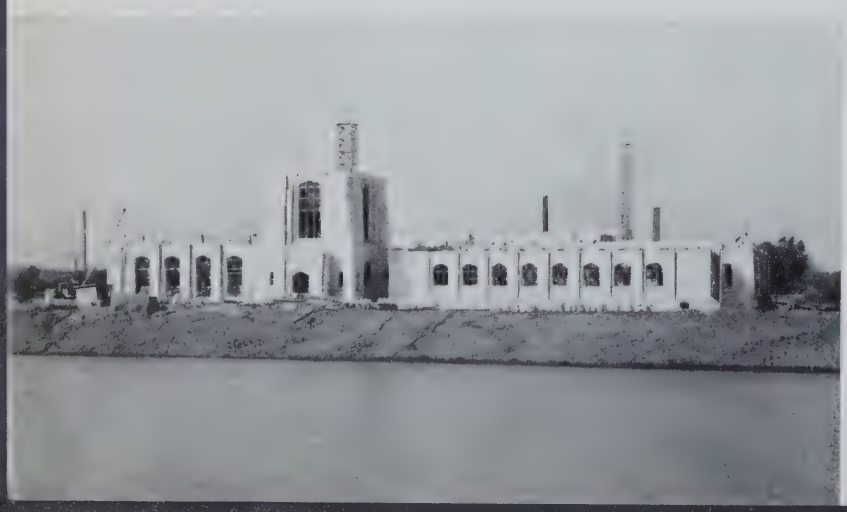
Acceptance Tests

After the plant has been in regular operation for a sufficient length of time to establish normal conditions of operation, performance tests will be carried out on the equipment to prove that the equipment has met the manufacturers' guarantees. It has been the general practice during the construction of the plant to test every pipe line to pressure double that under which it will normally operate. Under such tests the pipes have been required to be tight with a very small allowance for leakage. Every water-holding basin and reservoir, whether of concrete, steel or other construction, has likewise been tested for leakage and has been accepted only when the leakage, if any, has been shown to be within an extremely small allowance little more than that represented by evaporation.

In the case of pumping equipment, manufacturers have been required to test their equipment at their own factories and to show by such tests that the equipment fulfills the guarantees made for it. Again after its installation in the plant and after the establishment of normal operating conditions, the equipment has been tested to prove its suitability as actually installed. In fact, every part of the entire new plant has been subjected to tests of every reasonable nature from the start of its construction continuously through the period of its being placed in operation—and in general it may be said that building contractors and manufacturers alike have almost invariably met the requirements of their tests with complete satisfaction to the engineers and the city.

View of West Aerator showing progress of entire development. View taken Aug. 18, 1932.

Development of stone work in the entrance tower which supports wash water tank. View taken Sept. 15, 1932.



General view of Three Rivers project taken October 6, 1932.

HIGHLIGHTS

The construction of the St. Joseph River dam and pumping station involved the following quantities:

Nearly 4 miles length of wood piling.
Eight carloads of steel piling.
Nearly 20,000 cubic yards of excavation.
Seventeen carloads of reinforcement steel.
Over 6,000 cubic yards of concrete.
The pipe laid in the raw water supply main required about 40 cars for its shipment.

The Three Rivers filtration and pumping station involved the following construction quantities:

Over 21,000 square feet of hollow tile.
Nearly 28 miles length of piling.
Nearly 90,000 cubic yards of excavation.
Nearly 200,000 cubic yards of backfill.
Nearly 28,000 cubic yards of concrete.
This would have built a sidewalk from Fort Wayne to South Bend.
Nearly 100 carloads of reinforcement steel.
Over 50 carloads of pipe.
7,300 window panes or 11,000 square feet.
1⅓ acres of roof surface.
About 600,000 bricks.
Over 75,000 square feet of stone work or 1¾ acres.

The St. Joseph River, normally thought of as a fairly clear stream, carries dissolved and suspended solids in the amount of more than 50,000 tons per year.

The nominal annual output capacity of the city's new plant is fairly represented by a river 100 feet wide, 10 feet deep and 220 miles long.

The St. Joseph River station and the raw water supply main will transport water from the intake reservoir to the Three Rivers station at a cost of 2/100 of 1 mill per ton of water per mile.

The lime sludge removed by this plant in a year would make a cube over 50 feet long, wide and high. If suitable for road material it would build a concrete pavement 9 inches thick, 20 feet wide, nearly two miles long.

The water travels nearly a mile in its course through the Three Rivers filtration and pumping station. It requires over 8 million gallons of water to fill the Three Rivers plant not including the 19 million gallons to fill the filtered water reservoir. The Three Rivers filtration and pumping station structure weighs 68,000 tons, the water contained weighs 35,000 tons, making a total of over 100,000 tons. The filtered water reservoir structure weighs nearly 60,000 tons, the water nearly 80,000 tons, making a total of nearly 140,000 tons.

The product of this plant will be delivered to any consumer instantly on order day or night at a cost of less than 5 cents per ton. Compare this with the cost of other common commodities: Sand or gravel, $0.75 per ton; coal, $6.00 per ton; gasoline, $50.00 per ton; milk, $90.00 per ton.

RESERVOIR

CONSTRUCTED so as to take care of Fort Wayne's needs in the future when it has grown to a much larger size, the reservoir in the Three Rivers filtration plant is of mammoth proportions, much larger than one would expect. It is 492 feet long, 320 feet wide and 28 feet deep, with the one end 18 inches shallower. The following list of quantities required to construct this reservoir will give a good idea of the enormity of this project:

Excavation and back fill (This was moved in 86 days).	104,972 yards
Raymond concrete piling	77,958 lineal feet
Cement	72,282 sacks
Sand	8,430 tons
Gravel	15,331 tons
Form lumber	245,600 board feet
Reinforcing steel	1,134 tons

Various other materials were required to complete this vast undertaking.

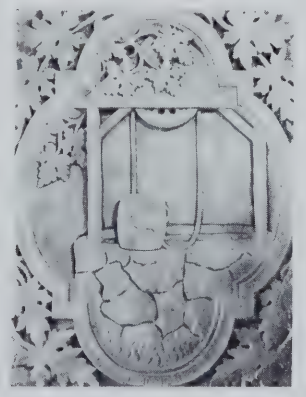
Approximately $86,000 was expended for both mechanical and common labor.

Actual construction was started March 20, 1931, pile driving was begun April 10, the first concrete was poured on May 12, and the reservoir was completed September 10, 1931 . . . a period of nearly six months.

The bottom slab is 12 inches thick while the ceiling is constructed of a flat slab 7½ inches thick supported by columns 12 feet from center to center. The exterior walls are 11 inches thick for the shallow portion of the reservoir, and 12½ inches thick for the deep portion.

The capacity of the reservoir is 20,000,000 gallons.

When the final test for water tightness was made, it was found that the leakage of water was so small after 72 hours that it could not be measured with a rule or ordinary measuring device. All in all, this reservoir is a perfect example of modern engineering.



OPERATION

Fort Wayne's New Water Supply System

The city's new water supply system, consisting of the upriver dams, the raw water supply main and the downtown purification plant and pumping station, will be in the charge of a general superintendent. Each operating unit of the plant will be manned by a staff experienced and trained for its particular duties. At the St. Joseph River pumping station the operators and their helpers, working in three shifts, will control and care for the operation of the hydro-electric generator and the pumps forcing the raw water from the intake reservoir down through the raw water supply main to the downtown plant. The staff at this station will probably number seven men.

At the Three Rivers filtration and pumping station there are three principal functions; the chemical treatment of the water, the technical laboratory control of the purification processes, and the pumping of the purified water into the distribution system. The staff at this station will be organized accordingly. In the chemical building there will be seven men working in three shifts in charge of the receiving, unloading, storage and application of chemicals, the mechanical control of the mixing, coagulation and settling processes. The laboratory staff, consisting of chemists and laboratory assistants, will have the responsibility for the technical control of all of the purification processes and the final quality of the product of the plant. There will be seven men on this staff working in three shifts serving the plant night and day. The pumping equipment will be in charge of a third crew of seven men also working in three shifts. These men will be charged with the operation and maintenance of the high-service pumps supplying the purified water to the city, the various plant service and drainage pumps and other mechanical and electrical equipment of the Three Rivers station.

Distribution System

The present water distribution system is constructed particularly to distribute water from the well sources now existing. The well stations, used before the construction of the new Three Rivers Filtration plant, are located around the city near the limits with a system of mains designed to bring the water pumped from the wells in towards the center of the city. The mains were so constructed because the heaviest demands for water are felt in the center of the city. It is now planned to turn the water from the new Three Rivers Filtration plant, which is located in the center of the city, into the present distribution system. However, it will be necessary to construct a number of feeder mains from the new plant for the purpose of maintaining equal pressure in all parts of the city. Heretofore, under the present well water system, certain sections of the city further removed from the wells were at intervals bothered by little or no water pressure. Under the new plan and with the addition of feeder mains radiating from the center of the city this will be eliminated. Provision is also to be made so that the city's old storage reservoir, now at too low a level to be served by direct pumping, can be floated on the distribution system by means of an automatic inlet and outlet valve control.

Wm. H. DROEGE
Sup't Asphalt Repair Plant and Materials Testing Laboratory

V. A. BARNETT
City Engineer

Test cores of concrete filed for future reference and examination.

MATERIALS TESTING

By

WM. H. DROEGE

Materials Testing Laboratories

In 1930 the Board of Public Works of the city of Fort Wayne installed a materials testing laboratory for the purpose of testing all materials and mixtures used in the construction of public works projects. Under this department mortar cylinders and drilled cores are taken from all materials used in the construction of public buildings, retaining walls, pavements, alleys, sidewalks and curbs. These specimen test cores are tested immediately for quality and filed in proper order for further testing, checking and examination at regular intervals.

Test specimens have been taken of the internal mass composition of Portland cement concrete used in the new Water Works reservoir. These tests and specimens were taken in 1931 at the time this portion of the project was under construction. Specimens have also been taken and filed of concrete used in the Filtration Building, the Water Works Pipe Line Manholes, the St. Joseph River Dam and Pumping Station, and also of the concrete used in the addition made to the City Light and Power Plant Building. In addition to specimens taken of the material used in the building, there are those made with the core drilling machine of the paving concrete exactly as used in the roadway surrounding the new Three Rivers Plant, of the asphaltic concrete surface and of the sheet asphalt binder and surface.

The materials testing laboratory is operated in connection with the Municipal Asphalt Repair Plant which has been owned and operated by the City of Fort Wayne for the past twenty years. This plant has a production capacity of 50 tons of asphalt mixture each day.

Some idea of the immense amount of work connected with this plant and of the money saved the taxpayers through the municipal ownership of this plant can be realized when it is considered that Fort Wayne has 2,760,000 square yards or 181 miles of asphaltic concrete or sheet asphalt surface out of the guarantee period set by the builders which must be maintained in first class condition by the city.

Through the present method of patching pavements that become in bad repair, the city's cost has been cut to 84 cents for each square yard of patchwork. This makes a maintenance cost of .0075 cents for each square yard of pavement area each season. Repaired pavements last from 6 to 44 years, making an average pavement life of 19.6 years.

This method of patching pavements permits traffic to continue throughout the patching period and immediately after the work is completed. The method is as simple as patching an ordinary automobile tire and can be followed both in Winter and in Summer.

ROLL CALL OF SPONSORS

The following companies, active in the building of the new Fort Wayne Water Works system, have made this souvenir of commemoration and dedication possible by contributing individually to its entire cost.

To them, we, as Fort Wayne citizens, owe a debt of gratitude.

MAYOR WM. J. HOSEY.

AUTOMATIC CONE VALVE CO.
Mattoon, Illinois
Cone Valves

DAHM BROS.
Fort Wayne, Indiana
Roofing

SIMPLEX VALVE & METER CO.
Philadelphia, Penn.
Meters and Gauges

FULLER COMPANY
Catasauqua, Penn.
Chemical Handling Equipment

THE WESTERN GAS CONSTRUCTION CO.
Fort Wayne, Indiana
Valves

GENERAL CABLE CORPORATION
Chicago, Illinois
Electric Cables

ROBERTS FILTER MANUFACTURING CO.
Darby, Penn.
Piping Erection

OMEGA MACHINE COMPANY
Kansas City, Mo.
Chemical Feeding Equipment

REPUBLIC STEEL CORPORATION
Massillon, Ohio
Toncan Iron Plate

THE DORR COMPANY, INC.
New York City
Sludge Removal Mechanisms

ALCO PRODUCTS INCORPORATED
New York City
Toncan Iron Pipe Fabrication

FLINN & DREFFEIN COMPANY
Chicago, Illinois
Carbon Dioxide Equipment

FORT WAYNE PRINTING CO.
Fort Wayne, Indiana
Printing

CUTLER-HAMMER, INC.
Milwaukee, Wisconsin
Valve Controls

RAYMOND CONCRETE PILE CO.
Chicago, Illinois
Concrete Piling

JOHN DEHNER, INC.
Fort Wayne, Indiana
Excavation and Water Main Construction

BUESCHING, HAGERMAN & CO.
Fort Wayne, Indiana
Filtered Water Reservoir

MAX IRMSCHER & SONS
Fort Wayne, Indiana
Filtration Plant and Pumping Station

BYRON JACKSON COMPANY
Detroit, Michigan
Centrifugal Pumping Units

V. M. NUSSBAUM & COMPANY
Fort Wayne, Indiana
Electrical Work

MICHIGAN VALVE AND FOUNDRY CO.
Detroit, Michigan
Valves

CHARLES R. WERMUTH AND SON
Fort Wayne, Indiana
St. Joseph River Dam and Pumping Station

WORTHINGTON PUMP & MACHINERY CORP.
Cincinnati, Ohio
Centrifugal Pumping Units

GENERAL ELECTRIC COMPANY
Fort Wayne, Indiana
Electric Generator and Switch Boards

THE JAMES LEFFEL AND CO.
Springfield, Ohio
Water Wheel

DIX-KELLY ELECTRIC SHOP, INC.
Fort Wayne, Indiana
Electrical Work

WALLACE & TIERNAN
Newark, New Jersey
Chlorine and Ammonia Equipment

FISHER SCIENTIFIC COMPANY
Pittsburgh, Penn.
Laboratory Equipment

SCHWEGMAN-WITTE COMPANY
Fort Wayne, Indiana
Plumbing

A. HATTERSLEY & SONS
Fort Wayne, Indiana
Heating

ART MOSAIC & TILE CO.
Fort Wayne, Indiana
Marble and Tile Work

BASS FOUNDRY & MACHINE CO.
Fort Wayne, Indiana
Boilers and Structural Steel

LYNCHBURG FOUNDRY CO.
Lynchburg, Va.
Cast Iron Pipe

FORT WAYNE PLATE & WINDOW GLASS CO.
Fort Wayne, Indiana
Glass and Glazing

ART IRON AND WIRE WORKS, INC.
Fort Wayne, Indiana
Ornamental Iron

GEAKE BROTHERS
Fort Wayne, Indiana
Stone Work

THE WM. BAYLEY COMPANY
Springfield, Ohio
Window Sash

WHITING CORPORATION
Harvey, Illinois
Crane

WARNER ELEVATOR COMPANY
Cincinnati, Ohio
Elevators

HIPSKIND HEATING & PLUMBING CO.
Fort Wayne, Indiana
Piping Erection

JOSLYN MANUFACTURING & SUPPLY CO.
Fort Wayne, Indiana
Reinforcing Steel

BRUNNER BROTHERS
Fort Wayne, Indiana
Painting

S. R. DRESSER MFG. CO.
Bradford, Penn.
Pipe Couplings

ASSOCIATED ENGRAVERS, INC.
Fort Wayne, Indiana
Photo Engravings

JOHNS EQUIPMENT CO.
Fort Wayne, Indiana
Pumping Equipment

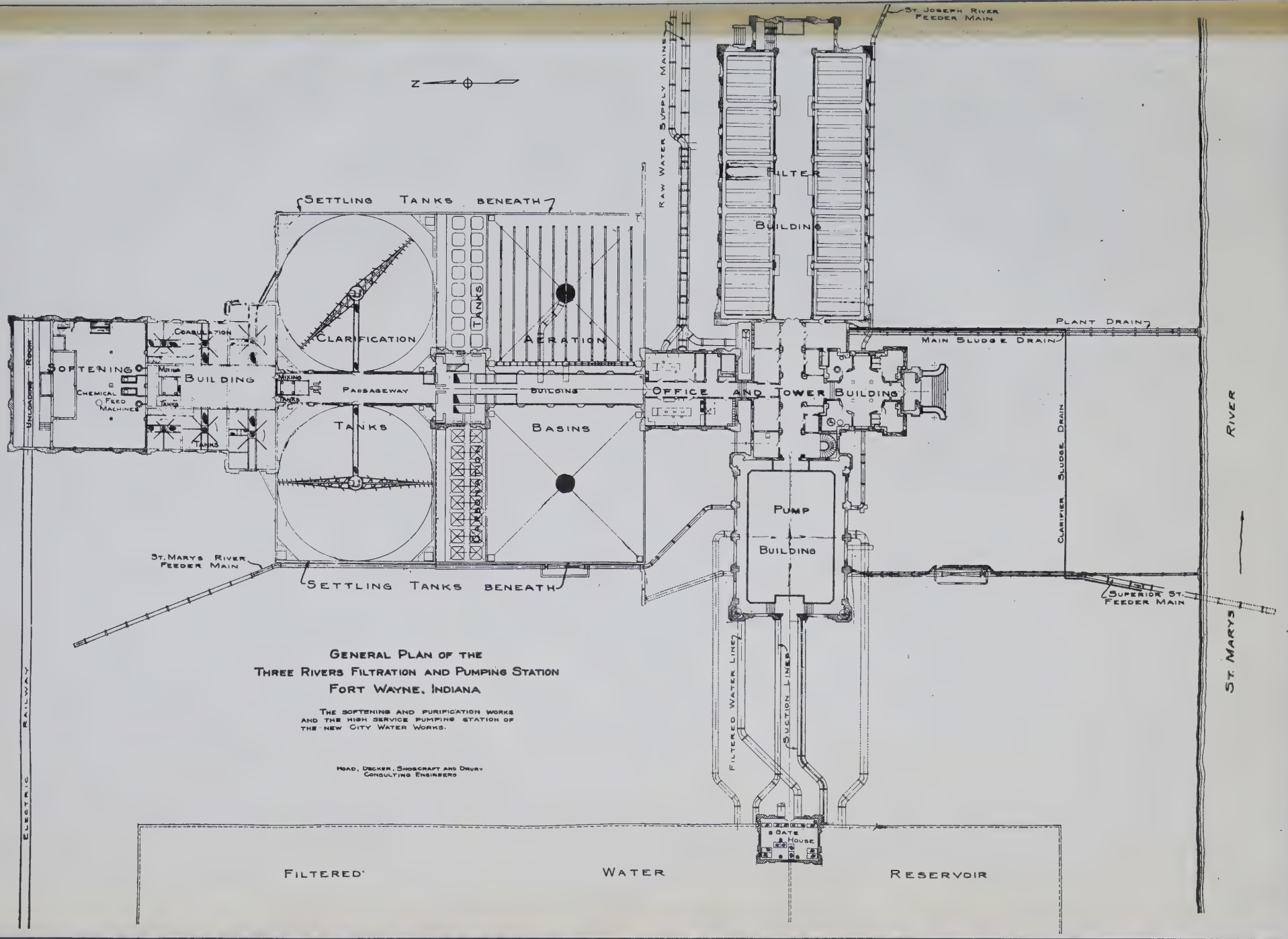
No municipal improvement in the history of Fort Wayne has combined utility and beauty in such a marked degree as has the filtration plant. The public appreciation of it will grow with the coming years, and it will remain a glorious monument to the courage and vision of its builders.

FRANK ROBERTS
Editor, Journal-Gazette

As a citizen of Fort Wayne the new City Water Works Filtration Plant in Three Rivers Park will be one of the show places to which I will find much delight in taking visitors.

However, it is more than a show place. It is a necessity and will insure Fort Wayne an adequate, as well as a pure and wholesome water supply for many years to come.

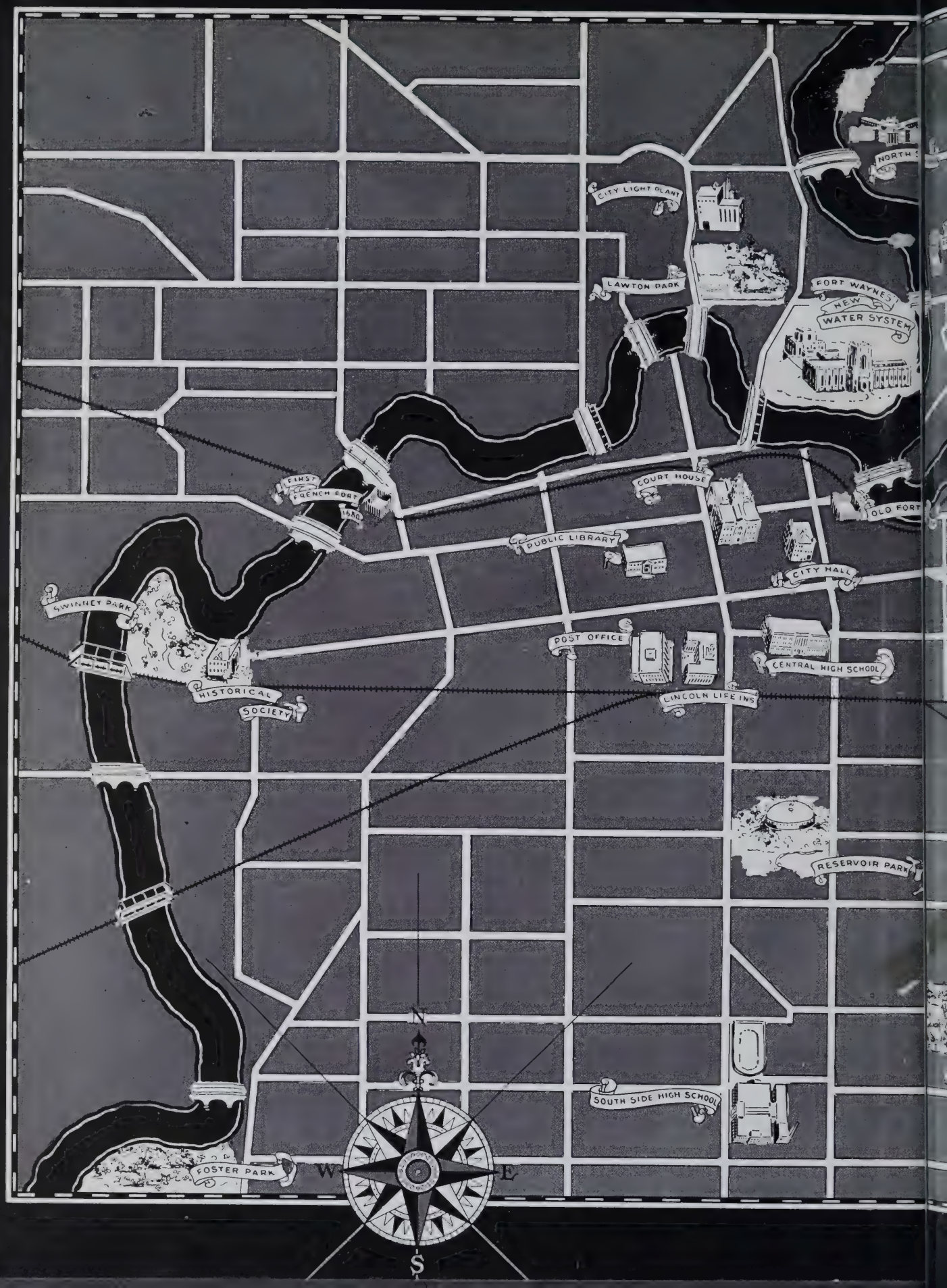
ARTHUR K. REMMEL
Editor, The News-Sentinel



General Plan of the Three Rivers Filtration and Pumping Station Fort Wayne, Indiana

The softening and purification works and the high service pumping station of the new City Water Works.

Mead, Decker, Shoecraft and Drury
Consulting Engineers


CITY LIGHT PLANT
NORTH
LAWTON PARK
FORT WAYNE'S
NEW
WATER SYSTEM
FIRST
FRENCH FORT
1680
COURT HOUSE
OLD FORT
PUBLIC LIBRARY
CITY HALL
SWINNEY PARK
POST OFFICE
CENTRAL HIGH SCHOOL
HISTORICAL
SOCIETY
LINCOLN LIFE INS
RESERVOIR PARK
SOUTH SIDE HIGH SCHOOL
FOSTER PARK
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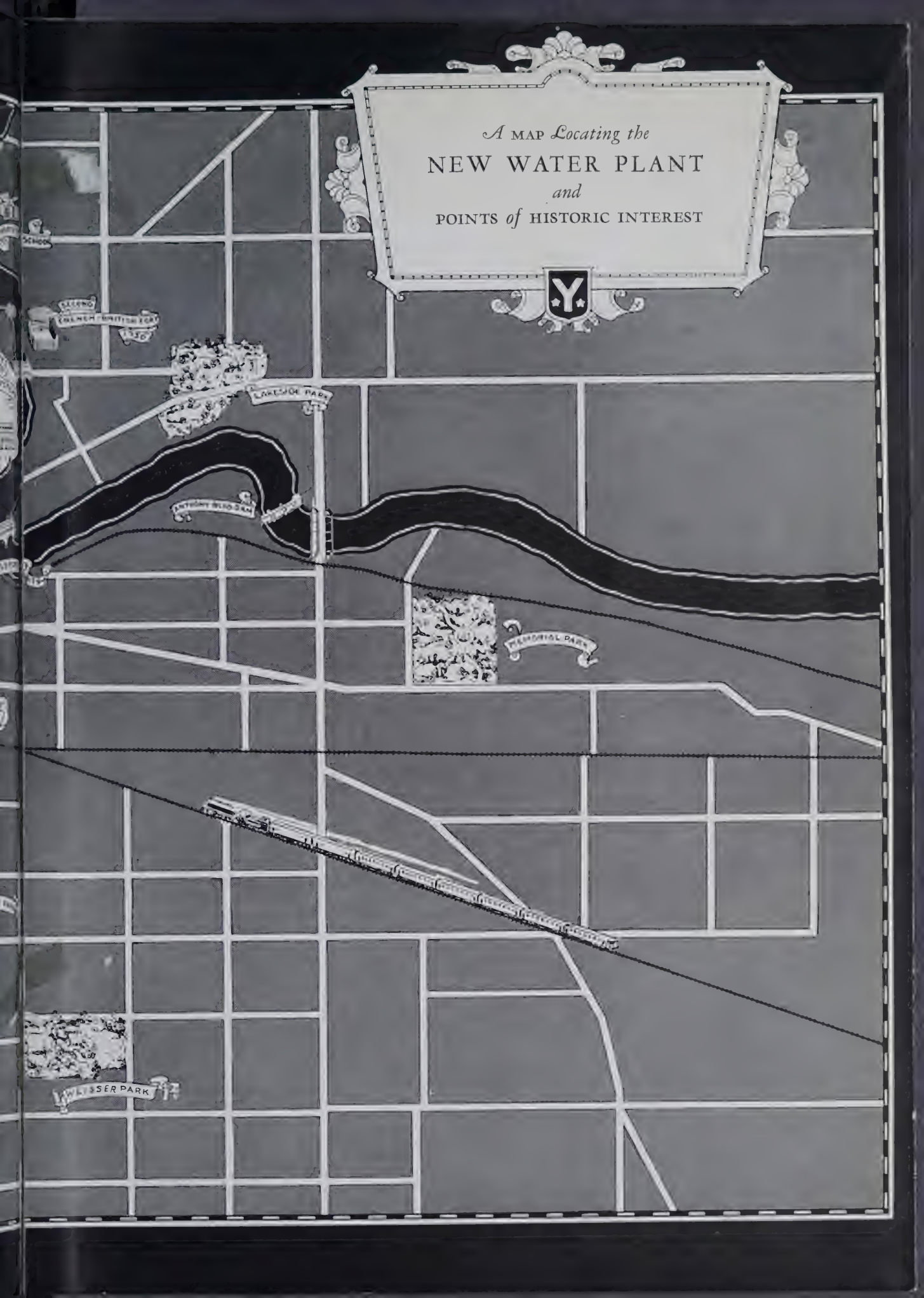
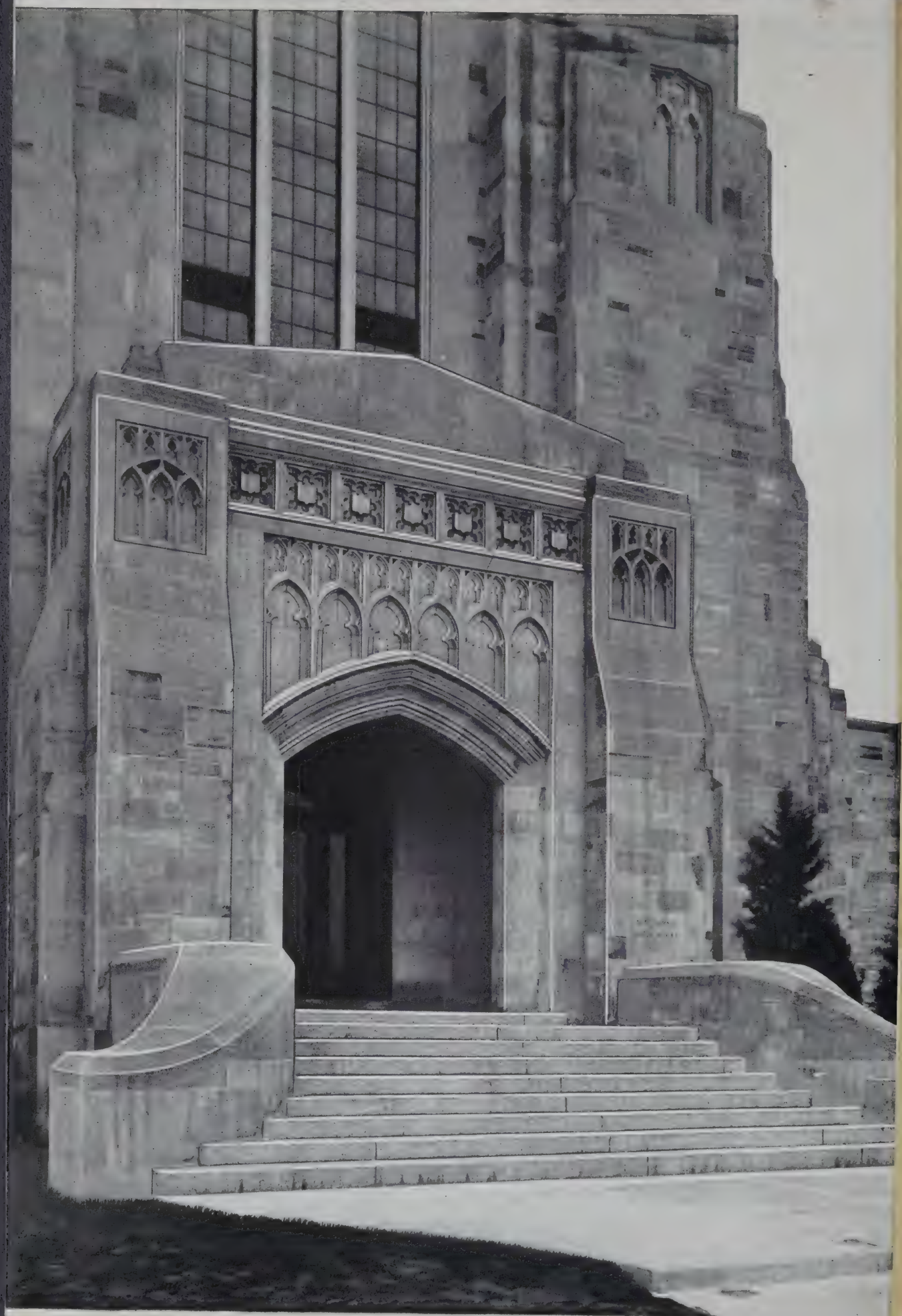

A MAP Locating the
NEW WATER PLANT
and
POINTS of HISTORIC INTEREST
LAKESIDE PARK
MEMORIAL PARK
WISSER PARK



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